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EDITORIAL

CANADIAN MINING INSTITUTE.

The 21st annual meeting of the Canadian Mining Institute will be held in Montreal on March 5th, 6th and 7th, 1919. Arrangements are being made to make the occasion a memorable one. Members will have an opportunity to celebrate fittingly the successful conclusion of the war. It is hoped that many soldier members will be back home in time for the meeting.

MANITOBA BRANCH C. M. I.

A meeting of the Manitoba branch of the Canadian Mining Institute was held in Winnipeg on December 17. Dr. R. C. Wallace, Commissioner of Northern Manitoba was in the chair. There was a dinner, followed by a business meeting and a talk on the resources of Northern Manitoba, by J. A. Campbell, former Commissioner. There was a good representation from The Pas, including H. C. Carlisle, manager of the Mandy mine, and R. Neal, manager of the Rex mine.

DOES LEASEHOLD SYSTEM KEEP CAPITAL OUT OF MANITOBA?

By an Order-in-Council passed in 1917, the Dominion Government adopted the policy of granting leases in place of title to all minerals naturally occurring in quartz. The effect of this Order-in-Council has been well pointed out by Dr. R. C. Wallace, Mining Commissioner of Northern Manitoba. Dr. Wallace writes in part:

"Manitoba is more directly concerned in this change in policy than any other territory to which the federal laws are applicable. In Saskatchewan and Alberta the mining of gold and copper is as yet negligible. In the Yukon territory placer mining—to which other laws apply—is still the most important industry. In Manitoba, however, the future of the mining industry will rest with the success with which quartz claims—for copper, gold, tungsten, and other precious minerals—will be operated. It is consequently of fundamental importance that the legislative control should be of such a nature that the industry in its infant stage should be encouraged and stimulated, and that a fair field should be safeguarded for the employment of capital from outside sources. The United States of America will undoubtedly supply the greater part of the capital on which Manitoba must depend for the development of her resources for many years to come. Under the Federal laws of the United States, as we have seen, the investor in mineral properties may obtain a title, and thus feel himself secure from interference in the development of his domain. It may be, of course, that this situation will not obtain for many years longer. In 1907, a special commissioner was appointed by Congress to investigate the actual working out of the leasehold system of mineral tenure, as practised throughout Australia and New Zealand. His report was an unqualified endorsation of the leasing system. Mining engineers, promoters and capitalists in Australia and New Zealand were practically unanimously of the opinion that their system of government leasehold of minerals, involving bona-fide development, was a practical success. Their verdict was all the more striking in view of the fact that in all the earlier days of mining in Australia the policy of alienation of mineral lands was in vogue; and even to-day in New Zealand the operator has the option of purchase, an option which is very seldom exercised. In view of this report, and official opinion quoted elsewhere, there is at least some foundation for the belief that the Federal laws dealing with natural resources may yet be modified. As the situation now is, however, the American capitalist who is looking for favorable fields for investment abroad is accustomed to the freehold system at home. He finds that in the already established mineral territories of Ontario to the east, and British Columbia to the west, he may obtain possession outright of the properties in which he may desire to invest his capital; while in Manitoba, a field which has undoubtedly great promise, but where the industry has not yet reached a sound footing, he can secure only a long term lease. There is a very strong feeling among practically all classes of mining men throughout the Province that, as the situation stands, it is more difficult to attract capital into mining investments than it would be were it possible to offer the security of freehold tenure. The development of a sound mining industry in the Province is of vital importance for the industrial life of the City of Winnipeg, and for the commercial future of a community which can only in part be dependent on agricultural expansion and all who are concerned that the foundations of our economic structure be truly laid, will be well advised to give thought to the conditions which this growing industry has to face.

"We may perhaps legitimately assume that the force of democratic feeling is behind the system of leasehold tenure whereby a certain measure of control is retained by the people at large. The logical conse-

quences of adoption of a leasing system are not so generally realized. If the people retain the ownership, they must also assume the obligation that development will be assisted by all means in their power. If we rent a house, we expect that the owner will see to it that the business of living in the house is made not merely tolerable, but reasonably pleasant. On a similar basis, the Dominion Government, by adopting a leasehold in place of a freehold system for minerals naturally occurring in quartz, has thereby tacitly assumed the responsibility of assisting mineral development to a much greater extent than heretofore; and if a similar system were to be adopted by the Western Provinces when their resources are handed over, the argument would apply with still greater force. The success which has marked the progress of the mineral industry in Australia and New Zealand under the leasehold system has been in large measure due to the fact that the various Governments have shown the greatest enterprise in providing transportation facilities into new camps, in erecting Government smelters and stamp batteries, and in assisting prospecting. In Manitoba the success of the mining industry rests first and foremost with the prospector. Nothing that will hamper his activities should be permitted to stand. Apart from the question of the system of tenure, the Dominion laws are particularly favorable to him, in comparison with certain laws that obtain in the Provinces. He would be compelled to admit that the erstwhile freehold system promoted a species of real estate gambling in mining prospects, which was not in the interests of the development of a sound mining industry. If, however, he does not receive specific assurance that under the leasehold system the Government will always stand ready to assist—within its own sphere of action—in developing all prospects that show good promise of success, he is justified in view of existing conditions in petitioning for a repeal of the leasing clause."

The experience of a year under the leasehold system has evidently convinced mining men in Manitoba that the Dominion Government does not take proper care of its tenants. They wish, therefore, to purchase title to the mining lands on which they spend money and labor.

SALT IN NOVA SCOTIA.

In a recent number we published a short item from one of our Nova Scotia correspondents, announcing that salt had been discovered near Malagash, Cumberland Co., Nova Scotia. We are fortunately able in this number to give some account of the history of this important discovery. Mr. L. H. Cole, of the Mines Branch, who has written the article, has devoted considerable attention to the salt mining industry. He is the author of the report on salt deposits and the salt industry of Canada, which was published by the Mines Branch in 1915.

There is something peculiarly appropriate in this discovery of salt in Nova Scotia. At present no salt is being produced in the Maritime Provinces, and the fishing industry has to depend on imports from across the Atlantic. We have good salt in Ontario, but the freight rate to the Atlantic is prohibitive. A large tonnage of salt is used in the fishing industry, and it now seems likely that Nova Scotia will produce it.

Another interesting feature of the discovery is the evidence of close co-operation between the prospectors and the Mines Branch. Mr. Cole is to be congratulated on the practical assistance he has given.

While Ontario produces must salt, there is no actual mining of rock salt in Canada. The salt in Ontario is obtained by pumping brines, natural or artificially made from rock salt at depth. The Nova Scotia salt beds are, however, near the surface. Rock salt mining may soon be added to our industries,

A MONOPOLY TO SHELL COMPANY?

According to a despatch from Ottawa, the Government has under consideration a proposal to give to the Shell Transport & Trading Company, Limited, a concession to enter upon and develop all the oil-bearing lands in the Province of Alberta, north of the Athabasca River. The concession is to be in the nature of a monopoly for five years, except that the rights of leaseholders and prospectors already there are to be respected. In return the company is to pipe the oil to Vancouver or to the head of the lakes, and after receiving six per cent. on its investment is to divide the remaining profits equally with the Government.

There will be considerable difference of opinion in this matter. It is generally recognized that Canada and the British Empire produce a lamentably small proportion of the oil consumed. There will therefore be much gratification if a great effort is made to speed up exploration for oil in Western Canada. On the other hand it is inadvisable that any company be given a monopoly. If the company is not willing to take the same chances as others who explore new areas in Canada it will find few friends in this country. We believe that every assistance reasonably possible should be given to exploration companies; but we would not like to see such assistance take the form of special privileges to certain companies.

The proposal as unofficially outlined in the news from Ottawa is one that should receive attention from the orginazation which represents the mining industry, namely the Canadian Mining Institute. If the Shell Company is willing to spend a large sum of money in exploring lands that are now unproductive, it would be folly to ask the Government to turn down the proposal without giving it serious consideration. Possibly a way might be found to meet the wishes of the company without making a foolish bargain.

FREEHOLD OR LEASEHOLD?

At a recent meeting of the Manitoba branch of the Canadian Mining Institute there was an important discussion on the relative merits of the freehold and leasehold system of tenure of mining lands. The opinion of the meeting was that the development of Manitoba's mineral resources would be accomplished much more rapidly if the freehold system were adopted.

Some months ago the law governing tenure of mining lands was discussed at a convention in Port Arthur, and the result of the discussion was similar to that at Winnipeg—a resolution in favor of the freehold system being passed.

Some years ago the Canadian Mining Institute, in framing proposals for a Dominion mining law, favored the leasing system. There is evidently no unanimity in opinion on this point, however, and it would be well to have the matter reconsidered.

Manitoba's mineral lands are administered by the Dominion Government. The men who are showing most interest in developing Manitoba's mineral resources evidently do not like the leasehold system. What do those in other Provinces think about it? We would be pleased to have our readers submit their ideas for publication. Free expression of opinion should help the officers of the Canadian Mining Institute to decide whether the policy adopted some years ago is in the best interests of the industry.

THE METAL MARKETS.

The signing of the Armistice was immediately followed by a great change in conditions in the metal business. One of the first actions of most munitions makers was to cut down purchases of metals. This loss of the munitions market has since been followed by a flood of unused or partly worked metal that has been turned back on the market. Naturally there has been a slump in buying orders, and some fall in prices. While the stocks accumulated for munition manufacture remain on the market, no stability in prices need be expected. Quotations for the present are mostly nominal.

It is not to be expected that metals will fall to prewar prices again, or that the cost of production will soon be as low as it was. On the other hand, it may be anticipated that when price restrictions are removed and an open market again established, it will be shown that present prices are no longer warranted by the demand.

The removal of the price restrictions will be welcomed by most producers. There is little satisfaction in high quoted prices if buyers do not appear.

EDITORIAL NOTES.

A Commissioner for Ontario is to be appointed to succeed the late Mr. Reid. Why should we not have in London someone familiar with Canada's mining industry and the opportunities for development? A Commissioner who could give information that would lead to greater interest in England in our mining industry would be in a positon to render good service to the Province.

Now that Manitoba has begun to figure more largely as a producer of minerals, the administration of the mining lands becomes a very important matter. At present Manitoba's mining lands are administered by the Department of the Interior, Ottawa. Would not greater interest be taken in developing the resources of Manitoba if the Province had control of its mineral resources?

One of the ways in which Governments can assist in the development of our mineral resources is that of preparing maps and reports that will be used by prospectors. During the past summer the Ontario Bureau of Mines has had men in the field mapping an undeveloped area near Lake Abitibi. When prospectors go into this area next summer they will be able to take with them geological maps and reports that will enable them to spend their time to the best advantage.

If the Canadian Mining Institute were merely a scientific society, how many members would have gathered at Winnipeg on Dec. 19th to discuss matters of vital importance to the mining industry of that Province?

The Telkwa Collieries, situated on the line of the Grand Trunk Pacific Ry. Co., northern British Columbia, are finding some difficulty in keeping coal moving from the mine to provide the domestic needs of Prince Rupert city and the adjacent district. Mr. Jabe Ashman, the Superintendent, asserts that there is plenty of coal in the bunkers, but, because of bad roads and for other reasons, there has been delay in arranging for its transportation.

That the British Columbia collieries are exporting coal before fully providing for the domestic needs of the Province is a charge made by the civic authorities of New Westminster, B. C. In a recent discussion of the fuel situation in that city it was stated that the dealers did not have their normal supply of coal and, if exceptional conditions arose, a serious shortage might develop. It was decided that Mr. Nichol Thompson, Fuel Controller, be requested to see that all home demands were filled before the collieries were permitted to fill export orders. Incidentally the action of Mr. Thompson in allowing the dealers to raise their price to the consumer 65 cents a ton following an advance in miner's wages of 75 cents a day was criticized, it being pointed out that the per capita rate of coal production at the mine was 5½ tons a day. One of the aldermen, taking the viewpoint of the dealers, sarcastically observed that "it pays to increase wages."

Problems of Coal Mining Industry of Nova Scotia

Consolidation of Operating Companies is Advisable.

By F. W. GRAY.

As the year draws to a close the declining tendency of coal production is still in evidence, and indications are that the output of 1918 from the Nova Scotian coal mines will be less than the output of 1917 by between 400,000 and 500,000 tons. The reduction from the basis of 1913 has now reached 31 per cent, and no recovery is in sight.

The end of the war has turned men's thoughts to the readjustment which must take place in the change from production for war purposes and production for normal peace time consumption. So far, however, as the coal mines of Nova Scotia are concerned, there need not for a long time to come be any occasion for worry as to disposal of the product. The output of the Nova Scotian collieries in 1913 was 7,250,000 tons. In 1918 it will scarcely exceed 5,000,000 tons. These figures are sufficient in themselves to tell the tale, because in 1913, although from various causes connected with the development of the collieries themselves some recession in production was to be anticipated, no one anticipated that the peak of Nova Scotian coal production had been reached, or that the consumption of coal in Canada was a decreasing factor. It is to be presumed that the Nova Scotian operators intend to re-enter the Montreal market so soon as the rate of production and the availability of means of transportation will permit, and this market alone used to absorb 2,000,000 tons of Nova Scotia coal per year.

As the writer explained in detail in a recent article in the Canadian Mining Journal, there is some reason to expect a tendency among the non-British European nationalities now employed at the collieries to move away, and, as demobilization will necessarily be a protracted process, there is little reason to expect any large number of men to return to the collieries from the army service. It would seem advisable for the authorities in considering the problems of reconstruction to take steps to check any wholesale movement of foreign labor from the collieries, and at the same time to give preference in repatriation to skilled coal miners.

It is intimated that the Amalgamated Mine Workers of Nova Scotia intend at their Convention in Sydney shortly to join the United Mine Workers of America, and to formulate fresh demands for an increase in wages, and for working conditions based on the Pennsylvania schedules. It is not to be hoped that wise counsels will prevail and prevent the occurrence of any crisis at the year end, as it will be remembered that this particular controversy brought about the disastrous strikes of the years 1908 to 1910 in Nova Scotia.

The mine workers state they wish to receive wages equal to any other coal district in North America, but it is quite evident they cannot receive wages that will render mining an unprofitable business. The advances granted in miners' wages in Nova Scotia since 1916 run from 75 per cent to 100 per cent, and this fact, combined with the increase in the costs of materials, and the decrease in the proportion of productive workers compared with the auxiliary workers at the mines, has made the cost of mining high beyond experience or belief. As a matter of fact, if it were not that the larger companies combine the manufacture of steel with their coal-mining operations it would before this have been necessary to abandon the extraction of coal, as the selling price is lower than the cost of production. If the miners do not take these facts into consideration in formulating their demands at the end of this year, it is quite certain that they must be resisted by the coal operators.

The only possibility of reducing the cost of mining coal to reasonable figures that presents itself at this time is a restoration of the balance between producers and non-producers. This can be achieved in two ways, first, by the return of the skilled miners, or secondly, by concentrating the miners in fewer collieries, which will require the closing down of a number of the most expensive collieries, and the discharge from employment of a large number of non-productive laborers. The last-named procedure would without doubt result in larger outputs at lower costs per ton. The operators have been deterred from following this course during the war for obvious reasons, but so soon as the ordinary laws of supply and demand commence to operate, the figures on the balance sheets of the coal companies will leave them no alternative, because it is quite evident that no operator can mine coal and sell it for less than it is costing him, except for a very limited period.

There is scarcely any factor that will so speedily lead to a reduction in the cost of manufacturing and transportation, and therefore to a reduction in the cost of living, as a plentiful supply of cheap coal. A scarcity of coal, accompanied by high prices, must necessarily restrict all industry and transportation, and must bring about high prices everywhere. Coal is such a basic commodity that a disorganization of the labor occupied in coal mining exerts a much greater influence on the community at large than might at first sight be thought could be occasioned by the comparatively small number of men employed in the coal mining industry. A restoration of normal working forces at the collieries is therefore a desideratum of first class importance from the viewpoint of the whole country, and it is a matter that should receive the earnest consideration of the authorities.

It has taken the whole course of the war to educate the public and the authorities to the essential nature of coal in war operations, and it is to be hoped that now peace is here the equally essential nature of coal supply in relation to the problems of reconstruction will not be lost sight of.

There is another feature to this matter. The war must be paid for, and increased home production is one of the ways in which the money can be found. It surely is not to the advantage of Canada to have the coal output of Nova Scotia continuing at an annual reduction of 2½ millions of tons. As the writer has previously pointed out, the decrease must be filled from the outside, and it helps to pile up an adverse trade balance against Canada, altogether unnecessarily.

Further, a large part of the coal production of Nova Scotia is today coming from small collieries commenced during the war. These enterprises are, in the writer's opinion, ephermeral, and must disappear so soon as the

selling price of coal declines ever so slightly. The burden of production will once again fall upon the large and stable companies. The production of these small mines, insignificant when considered individually, amounts in the aggregate to a respectable total, and, because of the practical cessation of extensions and development work at the larger mines during the war period, the big companies will not for some time be able to work up their production to a maximum, or anything like a maximum.

What does all this lead to? Inevitably, the writer believes to consolidations of the existing coal companies. In a Bulletin prepared for the Mines Department three years ago the writer expressed the opinion that "the chief hope of settled prosperity in the Nova Scotian coal trade lies in the further development of strong corporations with adequate financial reserves." The writer further remarked: "Whatever financial stability attaches to the coal companies of Nova Scotia is a testamentary benefit conferred by the General Mining Association; a monopoly that, with all its faults, yet rendered it possible to conceive mining operations on a comprehensive basis, eliminated suicidal competition in selling prices; and enabled mine workings to be laid out with the maximum of economy, with due regard to the conservation of the vast coal reserves which sporadic individual operations have tended to endanger by unco-ordinated effort."

These remarks are more pertinent today than when they were written.

PERSONAL.

Dr. W. G. Miller, Provincial Geologist of Ontario, has returned to Toronto after being in England for several months as Canada's representative on the Committee on Mineral Resources of the Empire.

Capt. W. M. Goodwin has returned to Canada, bringing with him a young lady from Scotland.

Nova Scotia members of the Canadian Mining Institute have nominated Mr. D. H. McDougall for the presidency of the Canadian Mining Institute. Members in the Porcupine gold district have nominated Mr. J. B. Tyrrell.

Mr. B. E. Neilly, of Cobalt, has been nominated for re-election as a vice-president of the Canadian Mining Institute. Among the nominations for council are: Mr. E. T. Corkill of Copper Cliff, Mr. Geo. Gillespie of Madock, Mr. Robt. Bryce and Mr. J. P. MacGregor of Toronto.

Prof. J. S. DeLury, of the University of Manitoba, is in Toronto for the holiday Prof. Debury is secretary of the Manitoba branch of the Canadian Mining Institute.

Mr. J. W. Powell, Mine Manager at Cassidy's Colliery, Granby Consolidated Mining & Smelting Company, has resigned and has been succeeded by Mr. James Hargreaves.

Mr. Hugh Sloan, Shift-Boss at Cassidy's Colliery, Granby Consolidated Mining & Smelting Co., died recently from pneumonia following an attack of Spanish influenza.

Mr. J. A. McRae, editor of the Mining Review, Cobalt, and a regular contributor to the Canadian Mining Journal, is just recovering from a severe attack of Spanish influenza.

Mr. D. C. McArthur, who played an important part in the development of the gypsum industry in Manitoba was present at the meeting of the Manitoba Branch of the Canadian Mining Institute in Winnipeg, Dec. 18th.

MANITOBA MINING MEN WANT FREEHOLD SYSTEM.

The Manitoba Branch of the Canadian Mining Institute held its first meeting of the winter in the St. Charles Hotel, Winnipeg, on the evening of December 19th. After an informal dinner and an interesting business meeting, the members and a number of guests listened to an interesting speech from J. A. Campbell, M.P., former Commissioner for Northern Manitoba, on "The Resources of Northern Manitoba." The talk was chiefly concerned with mineral resources, and the audience were plainly in accord with Mr. Campbell in his plea for provincial control of natural resources.

During the business meeting a resolution was presented by H. N. Baker, asking for a change from the leasehold system to the free-hold system, as applied to Quartz Mining Claims on Dominion Lands in the Province of Manitoba. On motion of T. B. A. Price, seconded by F. de Sieyes, after an interesting discussion, the meeting decided that the resolution be presented to the Canadian Mining Institute.

If the success and enthusiasm of a first meeting be taken as a gauge of the future activities of an organization, it can be safely predicted that the Manitoba Branch will have an important future, and will play an important part in the mineral development which we all know is coming in this misnamed "Prairie Province."

Among the guests present were: G. W. Allan, M.P.; R. L. Richardson, M.P.; Wm. Andrews, M.P.; and Hon. Edward Brown, of Winnipeg; Ferris Bolton, of Lisgar, and H. C. Carlisle, manager of the Mandy Mine on Schist Lake. Members from the districts of Rice Lake, Falcon Lake, Flin Flon and Herb Lake made the meeting representative of the whole Province. Among the members present from The Pas country were R. C. Wallace, President of the Local Branch; Walter Neal, manager of the Rex Gold Mine on Herb Lake, Bancroft; of the Mandy Mining Co., and Gordon, of Herb Lake. The Rice Lake District was represented by such old-timers as Hugh Smith, B. S. MacKenzie, Capt. Pelletier, and E. W. Jackson. From the Falcon Lake District came Capt. G. B. Hall, Frank Thoms, W. G. Chase (chief engineer of the Greater Winnipeg Water District), and L. Hicks. H. M. Paull, who with associates has recently made an important strike in the Knee Lake District, was also present.

Now that the influenza ban has been lifted in Manitoba, it is the intention of the Winnipeg Branch to continue their original program for monthly meetings throughout the winter.

RICH MOLYBDENITE ORE FROM TAYLOR MINE.

Returns just received by Mr. A. M. Taylor, who operates the Taylor molybdenite mine in Renfrew Co., Ont., show that the last car shipped averaged 5.3 per cent molybdenite. This car of ore was shipped some months ago to the Mines Branch laboratory at Ottawa. The ore was concentrated to 86.87 per cent MoS_2, the 68,644 lb. of ore yielding 3,852 lb. concentrates containing 3347.1 lb. MoS_2. The recovery was 92 per cent.

A car of molybdenite was shipped from the Hazelton View mine during the past winter and two tunnels are being driven, this development to continue during the next few months. The property is situated near Hazelton, B. C.

Interior Corrosion of Wire Ropes

Wm. Fleet Robertson's Report on Tests.

The inquest into the death of sixteen miners, which took place on the 10th of last September when the cable snapped in Protection Shaft, Canadian Western Fuel Company, still continues. The inquiry would have been completed had it not been for the delay entailed in sending Mr. Wm. Fleet Robertson, Provincial Mineralogist, to Montreal to make an exhaustive technical examination of the rope that broke and the postponement necessary because of the prevalence until recently of the influenza plague in Nanaimo city.

At the last sitting of the Coroner's Jury, which took place on the 16th of December, Mr. Robertson presented a report of the work he undertook at the laboratories of McGill University. He gave evidence which is of considerable general interest and of special importance to all identified, directly or indirectly, with the operation of mines in which wire ropes are in use. It is not improbable that, as a result, provision will be made for a more rigid inspection of such cables.

Dealing with the cause of the accident, as disclosed by technical researches, Mr. Robertson outlines his conclusions as follows:

"The failure of the cable was, in my opinion, entirely due to the oxidizing of the wires, chiefly internally, caused by apparent lack of any internal lubrication, leaving the wires exposed to the action of a more than normally corrosive water and a humid atmosphere.

"The internal hemp core, which under a sufficiently effective lubrication system, would serve as a reservoir of oil to keep the wires oiled and protected from corrosion, not being supplied with oil, became a reservoir of moisture and so hastened the corrosion of the wires.

"It is a well-known fact that if rust gets started in a steel structure, such rust will continue despite any surface application of anything that may exclude the atmosphere.

"Hence only a thorough soaking of the hemp core with oil before it is installed and a frequent renewal of the oil supply would be necessary to ward off corrosion.

"The fact that the tests showed the cable to be more corroded in certain parts than in others, and these not in any regular procession, may be accounted for by local conditions in the shaft of which I have no knowledge.

"The section of the cable about 4 or 5 ft. from the fracture, broke under a load of a little over 13 tons, and it stands to reason that the rope at the fracture had a lesser strength.

"The weight of the empty cage is given by the company as 4,357 pounds; the rope, 179 feet, weighed about 540 pounds; sixteen men at, an average of say 170 pounds, weigh 2,720 pounds. This makes a known dead load of 7,617 pound, or approximately 4 tons."

Mr. Robertson gives it as his understanding that the rope broke at a point which, at the time, was passing over the sheave and proceeds to say that "when a cable of this description passes over a ten-foot sheave, it is by the bending subjected to an additional 9,360 pounds or say roughly, 5 tons. This, in addition to the dead load as above, would give a strain in cable, if travelling slowly, of approximately 9 tons. This approaches so near to the breaking strain shown in Test 5 (described hereinafter) that it is scarcely necessary to assume extraordinary rough handling by the hoistman to account for the break.

As an indication that this sort of interior corrosion is not confined to the case in hand Mr. Robertson produced "a piece of 1¼ inch cable from a Sudbury mine which was tested at McGill University in my presence. It broke at 58,600 pounds, whereas the new cable had a breaking strength of about 128,000 pounds. I think you will agree with me that this cable shows but little deterioration discernible externally, whereas in the broken end, also exhibited, the internal corrosion is excessive."

Before proceeding to give details of the interesting experiments carried out at Montreal under Mr. Robertson's supervision it should be explained that he was furnished at Nanaimo with all the faulty cable which, for convenience, is divided into three parts, viz.: Exhibit 13: That part which was constantly on the hoisting drum in the engine-room. Exhibit 11: That 100 feet including the upper end of the fracture and extending upward. Exhibit 12: That 100 feet including the lower end of the fracture and extending downward to the cage. He also had the spiral springs designed to bring the safety clutches into action; a jar of water collected as it fell in Protection Shaft; and a bottle of black oil of similar character to that used in lubricating the cable. His directions were to submit these "exhibits" to "the most critical physical, chemical, and microscopic tests practicable in Montreal" with a view, of course, to establishing definitely and beyond cavil the cause of the break.

The results of the tests to which the cable was subjected are described in detail as follows:

Tests on Nanaimo Mine Rope.

Test 1: This piece of cable (that taken from the drum) showed only very slight wear and only on the outer wires, possibly caused by pressure on the drum. The individual wires were bright and free from rust. The cable was practically as good as new, and had been lubricated, grease oozing out as the strain was applied. The test piece taken was very approximately 36 inches between the grips. The load was applied in successive increments of 10,000 lbs. each, the elongation of the specimen being taken for each increment. The elongation for each 5 ton increment was 4/100 inches up to 70,000 lb. increasing gradually until at 120,000 lb. the elongation for the last increment was 8/100 in.—the total elongation under this load being 59/100 inch. At almost 130,000 lb. the elastic limit of cable seemed to be reached and the cable broke under a load of 160,000 lb., after sustaining such load for a minute or so, when 3 strands broke simultaneously a few inches below the upper grip. The pull being continued, the other three strands broke near the lower grip. The breaking strength of cable was 160,000 lb., or 80 short tons. As a check and confirmation of this test a 24" piece of cable adjoining the test piece was unwound—the individual wires somewhat straightened—and 6 of the larger wires and 3 of the smaller wires from each strand were submitted to a tensile breaking strain. These wires showed remarkable similarity in strength.

"The wires of average diameter of 0.1255 inclusive had average strength of 2540 lb.

"The wires of average diameter of 0.085 inclusive had average strength of 1165 lb.

"The aggregate strength of all the wires comprising the cable, if pulled straight, would be 179,100 lb. The strength of the cable, therefore, was about 89.35 per cent of the strength of the aggregate of the wires,

a result considered as indicating a well built cable. The tensile strength of the steel in the wires would be equivalent to about 208,000 lb. to the sq. in. This result taken with the uniformity in strength of wires indicates an excellent quality of steel in the cable.

Test 2: Sections of cable immediately above the fracture. The test piece from this was cut starting about 5 ft. above the tapered end of fractured cable. The exterior showed a certain amount of wear on the outer wires, but this was not at all serious. No broken or torn wire ends were observed on the surface in the whole length of the piece. A serious amount of rust was observable on surface wires. In opening up the end of the test piece in preparing it for the grip the small interior wires were found to be badly rusted and eaten away, so much so that several of them were found to be completely eaten through. None of the larger (0.1255 in diam.) outer wires were eaten through; but they also were badly corroded, a rough estimate being that the steel in these wires had about half the sectional area of similar wires in Exhibit 13 (the good rope). The cable and the core showed no indications of having been lubricated; both were dry and dusty. This test piece (tested similarly to the former) showed very even elongation for each successive increment in 5 tons in load, up to 60,000 lb. about which point the elastic limit seemed to be reached. Under a load of 81,900 lb. four strands of the rope broke, the break extending 12 in. below the grip. In breaking clouds of dust were given off, the doors of the building having to be opened to clear the air, indicating the interior to be very dry, with no indications of having been oiled. The two remaining strands broke under load of 21,000 lb.

Test 3: This and the following two tests are of three separate pieces of the rope from the fracture down towards the cage. The test under consideration was of a piece cut 11 feet from the end nearest to the cage. It was seemingly uninjured by its fall with the cage. It was not untwisted at all and there were no projecting or loose wires on the surface. The surface was somewhat worn and was corroted to at least half section of the externally visible wires. In the portion opened for the grip several of the small wires were found to be corroded completely through, as were a few of the larger wires. The load was applied as in previous tests. With each 10,000 lb. increment of load the elongation was practically constant up to 40,000 lbs., being about .07 in. for each increment. At about 40,000 lbs. certain of the interior wires were heard to break. At 49,400 lbs. the cable broke at about three inches below the upper grip. The centre core was absolutely dry and dusty, and large quantities of rust dust were given off on breaking.

Test 4: This test piece was cut 21 feet 6 inches below the fracture. The cable showed but slight wear but was much corroded both on surface and inter or wires, but as far as could be seen few if any of the wires were actually eaten through. No evidence of lubrication was visible in the interior of the cable. This piece was tested as were the former. The elongation for each 10,000 lb. increment was constant at about 5/100 inch up to 80,000 lb. which was about the elastic limit. Under a load of 106,000 lb. some of the interior wires were heard to break. At 109,800 lb. the cable broke, two strands parting about 6 inches below the upper grip. Subsequently the remaining strands were broken by re-application of the load. The third strand broke under load of 55,000 lb.; the fourth under load of 55,400 lb. and the fifth and sixth under load of 43,700 lb. Three strands broke near each end of the test piece.

Test 5: This piece was cut at 3 ft. below the point of break. It did not appear to be damaged by the fall. The rope was still tightly twisted and but slightly bent, not enough to materially affect it. This piece was badly corroded, so much so that even on the surface a number of the wires were seen to be completely eaten through and could be picked out with the fingers, but none of the ends projected. In the interior of the cable one of the sub-strands was completely cut through by erosion. There was no indication that the rope had ever seen oil. In opening up the two ends for the grip 32 wires were found completely erroded through and loose. The condition of the test piece was evidently so bad that the load was applied in smaller increments than in other tests. At 2,600 lb. load wires were heard to break in interior. The successive loads applied were 3,000 lb., 5,000, 7,000, and 10,000 (when elastic limit was reached) 20,000 and 25,000 lb. At 19,500 a number of wires were heard to break and at 22,000 more wires broke. At 26,700 lb. load three strands parted 12 in. below grip. The there remaining strands broke at 8,800 lb.

The cable in question had been in use for three years. It is described as being originally a first-class cable in every particular, well made and of excellent material, of Lang Lay's build and apparently up to specifications.

It is in the following paragraphs that Mr. Robertson deals with the very important point of the difficulties of adequate and satisfactory inspection under such circumstances as those under review:

"The amount of rust visible on the surface was serious and showed when the cable was dry; but, if the cable as it hung in the shaft was dirty, an inspection by passing the rope through the hand or against a stick, would fail to reveal the defect in the rope, and was useless in this case.

"In a shaft where the cable was subjected to heavy and constant work, the wear on the external wires would probably be so great as to wear certain strands through, thus producing projecting ends and these would be the first indications of deterioration of such a cable. The hand test might then be of value. But in the Protection Island Shaft the mechanical wear on the cable was slight, the failure being internal, hence not discernable by the method of inspection in vogue.

The spiral springs designed to bring the safety clutches into operation were of excellent quality, capable of a safe extension of about 30 per cent of their length and having a pulling power when so extended of about 1,250 pounds. It may be observed here that tests since made at the Canadian Western Fuel Company's yards, Nanaimo, have demonstrated that such springs and clutches do not give satisfaction on a descending cage, although brought into successful operation on an ascending cage suddenly released.

The oil used in lubrication is declared to have been of a character non-injurious to the steel. Of the water Mr. Robertson says: "There was no free acid in the water that would dissolve the steel, but the water was of such composition as to rust the steel more rapidly than pure water would, and would also be apt to wash off any external lubrication of cable faster than would pure water."

No verdict has as yet been rendered the Inquest having been adjourned until January 19th, 1919.

Notes of a Discovery of Rock Salt in Nova Scotia*

By L. HEBER COLE, Mines Branch, Ottawa.

A deposit of rock salt of considerable thickness is being opened up in the neighbourhood of Malagash, Cumberland Co., N.S. This is the first known discovery of rock salt in the Maritime Provinces, and the first in Canada to be discovered at a depth sufficiently shallow to enable it to be won economically by actual mining.

Discovery and History of Deposit.

In the fall and winter of 1916-17, a number of wells were drilled for water, by Mr. Peter Murray, on his farm on the Malagash road, about 7 miles northeast of Malagash Station. In each case salt water was encountered, at depths varying from 70 to 90 feet, and a sample of this brine was forwarded by Mr. Allan McKenzie, to the writer at the Mines Branch, Ottawa. It was found to be a saturated brine, its analysis being given in the following table, together with four analyses of brines from the Western Ontario salt district for comparison.

The overlying beds penetrated by the shaft are in a nearly horizontal position. They consist of clays, soft shales and gypsiferous muds.

The underlying saline beds dip to the west of south at an angle of about 25°, and have a strike of south 70° east.

The saline beds, as encountered in the shaft, show, in the upper 12 feet, considerable impurities in the form of mud, but whiter rock salt is now being excavated at the bottom of the shaft. The indications from a drill hole located on the site of the shaft are that the salt beds have a thickness, at this point, of nearly 50 feet.

The saline beds are found associated with beds of gypsum mapped by Fletcher as of lower Carboniferous age. These gypsum beds are seen exposed on the shore to the north of the shaft. To the south of the shaft there is a small unmapped outcrop of what ap-

TABLE I.
Analysis of Canadian Brines.

1,000 parts by weight contain:

	Malagash Brine, N.S.	Western Ontario Brine			
Sodium (Na)	99.50	96.270	101.728	96.368	100.997
Potassium (K)	0.55	n.d.	n.d.	n.d.	n.d.
Iron (Fe)	0.07	n.d.	n.d.	n.d.	n.d.
Calcium (Ca)	1.37	1.552	1.630	2.496	1.531
Magnesium (Mg.)	0.22	.244	.257	.127	.118
Sulphuric Acid (SO_4)	3.11	2.631	2.634	1.698	2.803
Chlorine (Cl)	154.70	150.122	158.742	152.294	156.884
	259.52	250.819	265.001	252.983	262.333
Hypothetical Combination: Parts per thousand.					
Sodium Chloride (NaCl)	252.90	244.860	258.770	245.111	256.891
Potassium Chloride (KCl)	1.04	n.d.	n.d.	n.d.	n.d.
Magnesium Chloride ($MgCl_2$)	0.86	.966	1.017	.503	.467
Calcium Chloride ($CaCl_2$)	0.22	1.265	1.484	4.964	1.007
Calcium Sulphate ($CaSO_4$)	4.42	3.728	3.730	2.405	3.971
Ferric Oxide (Fe_2O_3)	0.10	n.d.	n.d.	n.d.	n.d.
	259.54	250.819	265.001	252.983	262.336
Sp. Gravity at 15.5° C.	1.200	1.197	1.2045	1.178	1.198

In the summer of 1917, Mr. A. R. Chambers and Mr. Geo. McKay, of New Glasgow, took an interest in the operations, and drilled a series of holes, including a diamond drill hole, with the hope of proving the presence of a bed of rock salt, and, if successful, to obtain some idea of its extent. The results of the drillings proved rather unsatisfactory, no cores having been obtained. A prospect shaft was then commenced—June, 1918. In this shaft rock salt was encountered at a depth of 85 feet from the surface, and, when visited by the writer on October 10, 1918, it had penetrated to a depth of 17½ feetin in the salt formation.

Headframe at Magalash Salt Mine

* Published by permission of the Director of the Mines Branch.

pears to be New Glasgow conglomerate. The salt beds are on the south slope of an anticline, and little is so far known as to their lateral extent. To the west, about one mile from the shaft, there is a pronounced fault shown in the shore section, and this may cut off the western extension of the beds. To the east, about the same distance, the occurrence of a marsh, caused by the sea eroding the northerly lying and protecting sandstone barrier, may determine the eastern extension of the deposit. The evidence at hand, however, indicates the presence of a salt formation of considerable extent. On the basis of data obtained from the shaft, from surface indications, and from the drill holes, it is possible that the saline formation, measured at right angles to the dip, may have a thickness of 175 feet.

A general sample of the whiter rock salt was taken for analysis, with the following results: (Analyst, Mr. T. W. Hardy).

Dried at 110° C.

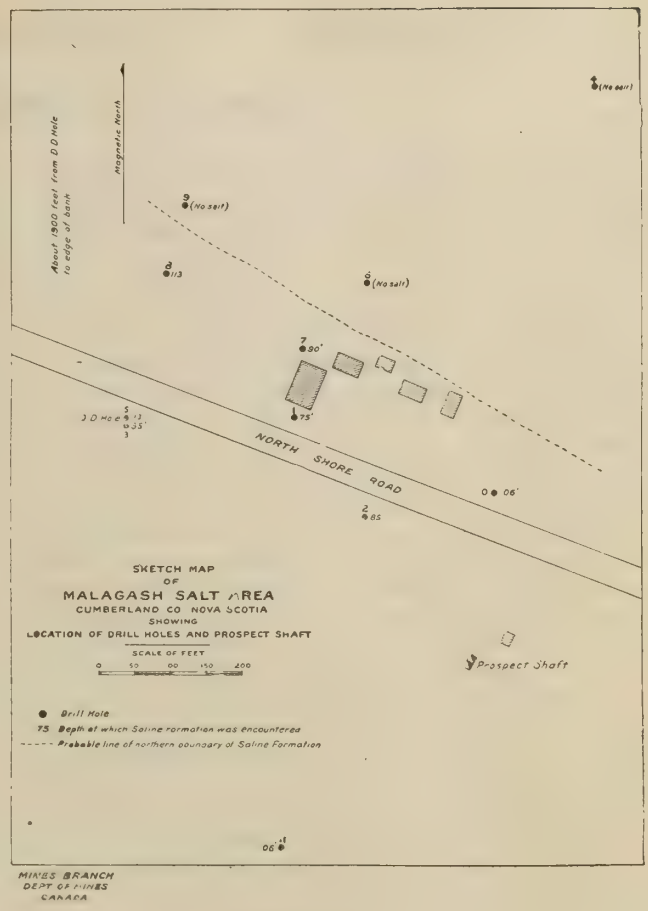
Sodium (Na)	38.45
Potassium (K)	0.20
Iron and aluminum (Fe and Al)	none
Calcium (Ca)	0.25
Magnesium (Mg)	trace
Sulphuric acid (SO_4)	0.61
Chlorine (Cl)	59.35
Insol. in water	1.05
Total	99.91

Conventional Combination.

Sodium chloride (NaCl)	97.60
Potassium chloride (KCl)	0.40
Magnesium chloride ($MgCl_2$)	trace
Calcium chloride ($CaCl_2$)	none
Calcium sulphate ($CaSO_4$)	0.86
Ferric oxide (Fe_2O_3)	none
Insol. in water	1.05
Total	99.91

Although the quantities of potash salts present in the two samples examined from this locality are small, it does not of necessity mean that they are absent in commercial quantities in this area. The drillings and prospecting so far carried out have only in the most superficial way indicated the presence of a large bed at one horizon, and the probability of encountering potash salts, interbedded with the sodium chloride at other horizons than the one penetrated by the prospect shaft and drill holes, is quite within the bounds of possibility.

First Blocks of Salt Mined at Malagash, N.S.



Malagash Salt Area

The importance of this discovery to the Maritime Provinces can readily be seen. The only salt producing district in Canada at present is the Western Ontario district. The Maritime Provinces consume about 50,000 tons of salt in the fishing industry each year. Owing to the prohibitive freight rates from western Canada, this salt has to be procured either from England, Spain or the West Indies. On the Atlantic seaboard of the United States, as well as in Newfoundland, a considerable tonnage of salt is imported for the curing of fish, etc.

It is evident, therefore, that the establishment in Nova Scotia of a modern salt manufacturing industry producing suitable grades of salt, would undoubtedly prove to be a profitable commercial enterprise.

Fire in the workings of the Princeton Colliery interfered with operations towards the end of November. It is now well under control, however, and work is proceeding.

One of the smaller powder houses of the plant of the Canadian Western Fuel Company, Nanaimo, B. C., was completely obliterated recently by an explosion, the cause of which is a mystery. Fortunately the accident happened when there were only a few men in the vicinity and no one was seriously injured. It is thought that some detonators were left in the building by mistake and that the explosion was the result of some of these falling to the cement floor.

German Methods of Destruction in the Mining Districts of France*

(Some very interesting articles have been lately published in the "Echo des Mines et de la Métallurgie" of Paris, on visits made by engineers to the liberated regions of France, where the British troops, and particularly the Canadians, have so distinguished themselves. —A short abstract of these articles, may be of interest to the readers of the Canadian Mining Journal.—It is to be noted that both Mr. Weiss and Mr. Defline, members of the Commission mentioned below, were official representatives of the French Department of Mines at the Geological Congress in 1913, and that both took active part in the discussions on the Coal Resources of the World, at the Toronto sessions of the Congress.)

"The town is a mass of ruins; the bricks themselves are reduced to dust. Mr. Basly, the mayor, was unable to identify with certainty the remains of the City Hall."

The Committee first of all visted Colliery No. 12 of the Société des Mines de Lens. The head-frame has collapsed, the mine is flooded, and the lining has been destroyed by blasting. Colliery No. 1, to the north-east of Lens is in the same state, the enormous tumbled down superstructure alone revealing the location of the shaft.—Approach to Colliery No. 13 is difficult and the shaft can only be reached by crawling through. the tangle of metal beams which represents the remains of the head-frame. The tubbing of this shaft is not destroyed. Neither is the lining of shaft No. 5, which is 300 metres deep, and in this colliery there is no more water than in any mine which has not been operated for some time. Of Colliery No. 15, at Lens, of which the head-frame was known as the "Tower Bridge" among the British troops, not a vestige remains.

"Under the most favourable conditions," says the official preliminary note of the Commission, "the hoisting of coal in small quantities from the pits, may be resumed in from 8 months to two years, but normal pre-war production cannot possibly be hoped for in less than five years."

At Courrières, where the "Compagnie des Mines de Houille de Courrières" had twenty shafts and 12,000 men, every single surface plant has been systematically destroyed with fiendish thoroughness. In both Lens and Courrières there is nothing that can be repaired; it is a case of clearing away the ruins and reconstructing entirely.—At Wingles, the iron and steel plant of the "Société Métallurgique de Pont-à-Vendin," comprising three blast furnaces, open-hearth steel plant, coke ovens, has been razed to the ground, the machinery having long previously been removed. These plants had just been completed at the cost of over forty million francs when war was declared, and operations were just starting.—From the testimony of liberated inhabitants most of these wanton destructions were effected at the time of evacuation of the German troops, when they were pushed back by the British army.

In the Anzin and Aniche districts the mines were working until the end of September, 1918, under German rule.—Owing to the hasty retreat there was less time available to destroy the shafts and underground workings, but all the machinery has been rendered useless, the favorite method having been to set off dynamite charges in steam chests, and cylinders, of hoisting engines, compressors, motors, and in general in all essential parts of machines and apparatus.

A few weeks ago a special commission, among the members of which were Mr. Basly, Mayor of Lens, Mr. Perrier, chairman of the Mines Committee of the French Chamber of Deputies, Mr. Weiss, Inspector -General of Mines, Mr. Defline, Director of the Service des Mines, and several mining engineers from Lens and Courrières, made a preliminary investigation of the state in which the German hordes left the French coal mines of the Lens-Courrières district on their retreat towards the Rhine.—Everywhere, scenes of desolation met their eyes. with a methodical ruthlessness the Huns, on withdrawing from this rich industrial and mining region had proceeded to systematically sack and thoroughly destroy all the plants. At Lens, of the 10,000 houses which constituted the town *not a single* one is now standing. In many of the cellars time-bombs had been placed, and during the first period of occupation of the town by the British troops, every ten minutes or so a violent detonation would take place, sending up heavy clouds of smoke and gas. The Royal Engineers, unfortunately at the cost of numerous comrades, have become experts at detecting the presence of these engines of destruction. They search for them diligently, and on discovering them, a warning signal to take cover is given, and a charge of high explosive is then set off to explode them prematurely.

"A large share of our thanks," says "L'Echo des Mines," must go to the members of the British Labor Corps, who do heroic work with characteristic imperturbability, frequently under enemy fire. After 24 hours of continuous work in Lens they had cleared the main streets sufficiently to render circulation possible."

*Abstracted from "L'Echo des Mines et de la Metallurgie," by Theo. C. Denis, Quebec.

OBITUARY.

William Lewis Phillips.

William Lewis Phillips, ex-President of District 18, U. M. W. of A., which includes the Eastern British Columbia and Alberta Coal Mining Camps, who left Fernie, B. C., with the 225th Overseas Battalion, C. E. F., has been reported killed in action on September 28th last. Thomas, a brother, was officially reported killed on September 29th, the day following. W. L. Phillips first came to Fernie from Wales seven years ago and was employed on the engineering staff at the Crowsnest Pass Collieries. After holding minor offices in the Fernie Union he was elected to the post of President of District No. 18 in 1914. After the expiration of that term he was re-elected, but resigned before the end of the year in order to take up arms with the Canadian forces. Two brothers, David E. and Richard S. are residents of Fernie.

The Voigt Claims, situated on Copper Mountain, near Princeton, B.C., are being closely inspected by representatives of the Consolidated Mining & Smelting Company of Canada, which recently acquired control of this property. Extensive development of this deposit of low grade copper is expected to commence early in the new year.

Special Correspondence

BRITISH COLUMBIA.

Loper Pardoned.

Mr. G. Weaver Loper, a mining broker who was charged with over-issuance of the stock of the Lucky Jim Zinc Mines, Ltd., and sentenced to ten years in the Washington State Penitentiary, has been granted a pardon by Governor Lister. Loper has suffered a stroke of paralysis, and his condition is said to be grave.

Labor Conditions at Anyox.

Mr. E. E. Campbell, Superintendent of the Anyox, B.C. Mine of the Granby Consolidated Mining & Smelting Co., and O. B. Smith, general superintendent of the company's mining operations, have returned to Anyox after visiting the Ketchikan district of Northern British Columbia. Mr. Campbell states that normal conditions have been attained again at Anyox after the set-back caused by the influenza. Labor now is comparatively plentiful, many loggers and other workmen, who had been employed in logging camps busy on war production, being available.

Predicts Great Future for Portland Canal District.

Mr. G. A. Clothier, British Columbia Provincial Resident Mining Engineer for the Northwestern District, recently reported to the Board of Trade of Prince Rupert that "taking everything into consideration I think the district at the head of Portland Canal is destined to become one of the most active and permanent mining areas in British Columbia." He urged that immediate steps be taken towards the construction of a dock and approach thereto.

Alaska Gatineau Now Working Two Shifts.

More men being available since the signing of the Armistice, the Thane mill of the Alaska Gatineau company has another shift at work, and shortly will have a third shift, running night and day. Both Manager George T. Jackson, of the Alaska Gatineau, and P. R. Bradley, of the Treadwell Properties, states that difficulty is being experienced in obtaining practical miners.

300,000 Tons and Concentrates Shipped to Trail Smelter.

Conditions relative to the operation of the Trail Smeltery of the Consolidated Mining and Smelting Co. of Canada, Trail, B.C., which were serious during November and for about a week in December, owing to the Spanish influenza epidemic, are improving. When the plague was at its heighth it was impossible to get ore cars unloaded, a large part of this work being done by contract. The immediate result was that for a time the company placed an embargo on ore shipments, having some 150 unloaded cars in the yards. The cost on demurrage alone was $500 a day, and it is estimated that the epidemic cost the smelter from $50,000 to $75,000.

Up to and including the first week in December over 300,000 tons of ore and concentrates have been shipped to the smelter of the Canadian Consolidated Co. at Trail, B.C. Three new shippers have appeared on the list this month (December) namely: Silver Hoard Mine, Ainsworth District, 21 tons; Grant Mine, Woodbury Creek, 4 tons; and Spokane Mine, Salmo, 20 tons. In the last weekly ore report of the Consolidated it is shown that the East Kootenay District has gone over the 100,000 ton mark in the year's shipments; that the Boundary District is over the 20,000 ton mark; that the Slocan District exceeds 30,000 tons; and that American mines have sent not quite 11,000 tons of ore to the Trail Smelter in 11 months.

More Activity in Placer Mining.

It is interesting to trace, by means of the records of applications for leases on the different placer grounds of British Columbia, the effect of the market demand and general conditions during the last several years. In 1915 values had not mounted to dizzy heights, and the labor problem was not very serious, with the result that the mining of the placer areas of the Province for their gold contents proceeded much as usual, about 160 leases being issued during the twelve months. The following year, however, found the quotations on metals of all kinds ascending, but gold remained stationary. This fact, together with the dearth of labor and the high costs, had its effect on the miners' interest in the placers of the Canadian West. The applications for leases dropped to 87. In 1917, although the same conditions obtained in regard to the price of gold and the problems of labor and of cost of operation continued, the insistent demand for platinum, which is found in many of the placer grounds of the Province with gold, and the high value at which it was quoted, namely $105 an ounce, once more fired the enthusiasm of prospectors and of operators. This is conclusively indicated by the issuance by the Provincial Department of Mines of 139 leases. The total for 1918, although the year is not quite at an end at the time of writing, will show that the interest was maintained as it will reach approximately 137 leases. Of the latter 35 bench leases and 9 dredging leases were granted during the months of October and November, which would seem to indicate that the predicted revival of gold production following the declaration of peace is being anticipated.

Ward-Hopp Litigation.

The latest phase of the long-drawn-out Ward-Hopp litigation was the Sheriff's sale in November at Prince George, B.C., of Mining Leases Nos. 1488 and 1494 under order of a writ of the Supreme Court of British Columbia. The said leases were those staked by John Hopp in 1913 and comprise the hydraulic mine at Bullion, B.C., formerly operated under the management of the late John B. Hobson.

The original company expended a large sum of money in development and working and washed out $1,300,000, which was a long way under the expenditure. The property was then sold to the Guggenheims, who began an elaborate development scheme, which came to an abrupt end in the panic of 1907. In May, 1913, Hopp staked the ground, which was granted to him finally under Leases 1488 to 1494. In October, 1913, R. T. Ward bought the Guggenheim rights, his contention being that the terms of the special act of the British Columbia legislature granted to the original company and acquired by the Guggenheims made the acquiring of a Free Miner's Certificate in order to hold the ground necessary.

In the resultant legislation Hopp was sustained by the Supreme Court of British Columbia but Ward, appealing to the Supreme Court, won. Hopp since has appealed to the Privy Council, where the case rests.

The purpose of the sale in question was to force court costs on Hopp and resulted in the bidding in of the leases to Mr. John A. Whittier, of Vancouver, for $325.

South Eastern Mines Co.

A. S. Holmes, manager of the South Eastern Mines Co., of Skidegate, Queen Charlotte Islands, B.C., states that preparations are being made for the further development of this gold bearing property and that it is expected that work will have made sufficient progress to make possible regular shipments at an early date. The ore carries free gold and some silver, lead and copper values. A shaft has been sunk to a depth of 100 ft., and about 600 ft., of drifting and cross-cutting has been marked by encouraging developments. It is proposed to instal a cyanide mill to treat the mine product.

B. C. Fluorspar Deposits Will be Developed.

Although it is not many months since the Canadian Consolidated Mining & Smelting Co. acquired a promising British Columbia fluorspar property, it has made such progress in development, and has made practical tests in the manufacture of hydrofluosilicic acid with such satisfactory results, that it is proceeding to open up the mine on an extensive scale. By the beginning of January the company, which already has forwarded several carloads to New York and Philadelphia, hopes to be able to begin regular shipments at the rate of from 1,200 to 2,000 tons a month. To facilitate this, an aerial tramway is being constructed for a distance of several miles from the mine to the railway. Thus the local requirements, which before had to be provided for by shipments from Kentucky, will be cared for, and there will be sufficient surplus to permit the export of considerable quantities.

Was Poor Coal Supplied Str. War Charger?

A short time ago the ss. "War Charger," after taking on coal in British Columbia for a voyage to the Orient, had to put back to port for the reason, according to statements given publicity, that she was unable to proceed on this fuel. On returning she loaded with Welsh coal. This reflection on the steaming quality of British Columbia coal is resented, it being maintained that it has been subjected to every test, practical and otherwise, with the best results and that it is so satisfactory that one of the Vancouver Island Collieries was able to enter into a contract to supply the Pacific Fleet of the United States Naval Forces. If the Str. "War Charger" was in trouble of the kind, which there is no disposition to deny, it is asserted that she must have been given an exceedingly poor quality of fuel and that the responsibility should be placed where it belongs and should be generally understood in the interests of the industry. The Board of Trade of Vancouver City has taken the matter up, its members pointing out that absence of a full explanation of the Charger's return is likely to leave the impression in England and elsewhere that a boat cannot be coaled in British Columbia to the satisfaction of the naval authorities. Some declare that the matter is of sufficient importance to warrant the fullest possible investigation by a civic commission.

The Greenwood Smelter May Be Operated By City.

That the Phoenix mines should be prospected by diamond drill with a view to demonstrating ore values in order to obtain the necessary supplies for the operation of the now idle Greenwood (B.C.) Smelter is a suggestion made by residents of the district. It is said that the Provincial Government is to be asked to extend financial aid to permit the starting of this work. Hon. J. D. MacLean, Provincial Secretary and the member for Greenwood, and Mr. J. E. Thompson, Member of Parliament for Grand Forks, B.C., are said to be in sympathy with the proposal and to be ready to render their support to any representations made along this line. Through Mr. Oscar Lachmund, former general manager of the Canada Copper Company, commercial interests of Greenwood City, determined that the smelter shall not remain inactive, have asked the last named company to lease the plant for $10,000 a year in order that the citizens' company may operate it. The Canada Copper Company directors at New York City are said to have these and other suggestions under consideration.

Ore Shipped From Blue Grouse Mine.

Two carloads of ore have been shipped from the Blue Grouse Mines, Cowichan District, Vancouver Island, to the Trail Smelter, and it is stated that shipments will be made regularly from now on. During the last few months considerable exploratory work, including drilling, has been in progress with satisfactory results, according to report.

Prince Rupert Wants a Smelter.

With the recrudescence of mining activity in the Portland Canal District, the City of Prince Rupert has commenced an agitation for the establishment of a smelter at that point. Commenting on this a mining man of Northern British Columbia says: "The one thing needed just now is a smelter near enough to the mines to enable the owners to ship at a profit. It is the one thing that will stimulate the mining industry. There are plenty of mines that could ship if it were not so expensive. Take as an instance, the American Boy mine. It was unable to ship on account of the cost, but when the Silver Standard put in a concentrating mill it was able to handle 25 tons a day from the American Boy, and the property at once changed from an idle prospect to a producing mine, which is paying well. Many other mine owners wanted to ship to the mill, but there was not sufficient capacity to enable it to take any custom work except from the one mine. There is no doubt about the desirability of establishing a smelter in the neighborhood, and Prince Rupert certainly is the logical point to enable shippers to avoid double handling. If it is built on tidewater and on the railway the mines from the interior can ship direct to it and the mines up and down the coast will have the benefit of cheap transportation. At Stewart, B.C., there will be important developments in the Spring. It is possible that Sir Donald Mann will build a smelter to handle the ore from his mines as well as that from others in the district."

Important development is in progress on the Galena Farm Mine near Silverton, B.C., an ore body 11 feet wide, having been reported to have been struck which contains two feet of galena.

Granby Finds More Good Ore.

A large deposit of a good grade of copper is reported to have been struck by the Granby Consolidated Mining & Smelting Company during the past season on the Ecstall River, which is a tributary of the Skeena River, into which it flows at the town of Port Essington, Northern British Columbia. Diamond drilling operations were carried out on the property which is an immense body of iron pyrites. It has been held for some twenty years by Victoria, B. C., interests and during that period some development was carried out, several tons of the pyrites being shipped to Victoria for the manufacture of sulphuric acid by the chemical works. The deposit consists of a mass of pyrite lying in schist formation, the belt being about a mile wide. The old work consisted of a crosscut tunnel a hundred feet in length and drifts twenty feet from it each way on the ore. While local officials of the company do not deny or confirm the report it is accepted by mining men as accurate and it is stated that the prospects are that the Ecstall Property may prove to be as big a thing as the Hidden Creek Mine which supplies the smelter at Anyox, B. C.

Grand Forks Smelter Again in Operation.

The Granby Consolidated Mining & Smelting Company's smelter at Grand Forks, B. C., which was closed down for a period because of lack of ore and coke, the result of the illness of many of the miners while the Spanish influenza epidemic was at its heighth in the West, has resumed operations. Three furnaces now are in blast and it is expected that there will be no further interruption, supplies being assured.

Developing Portland Canal Properties.

Following the report that the Big Missouri Claims, Portland Canal, B. C., have been acquired by Sir Donald Mann, who proposes their extensive and systematic development, comes information of other promising prospects in the same locality.

The Georgia Mining Co., the property of which is 18 miles from Stewart, B. C., has been worked all summer with good results. It is a free gold proposition and a mill is necessary to get the best results. It is near the coast and transportation facilities are provided by a good trail. Mr. C. H. Dickie, of Duncan, B. C., is the owner.

A new shoot of ore is reported to have been opened up at the Brown-Alaska Mine, also in the same district. Several thousand tons of ore were shipped from here some years ago. Work has been underway during the past few months and the new showing is said to consist of a couple of hundred feet of log grade copper. The possibility of installing a concentrator is being discussed. Mr. Martin Woldson, of Spokane, Wn., is the owner and Andrew Solstad has been in charge of development. The mine has closed for the winter but work is expected to be resumed early in the spring. Limestone has been obtained at Swamp Point, near Stewart, this summer by the Granby Consolidated Smelting Company for fluxing use at its Anyox Smelter.

Larger Output From Rossland Mines Expected.

Rossland (B. C.), one of the chief mining centres of the Province, which has been hard hit by the practical closing down of its larger mines controlled by the Consolidated Mining & Smelting Co. of Canada, is looking forward to better times. It is stated that the purely development work, which has been in progress during the past year, will lead to more than has been generally anticipated. Experiments are reported to have disclosed a new method of successfully treating, at a lower cost, the low grade ores of the camp at the Trail smelter. The output of the Rossland Mines is expected, as a result, to be increased from several hundred tons a day to between 1,000 and 1,500 tons per day.

B. C. Coal Output for November.

The coal output for British Columbia for November, 1918, shows a material decrease in comparison with the previous month, the difference being approximately 49,476 tons. This is explained by the fact that the Vancouver Island Collieries, in almost every instance, failed to do as well owing to the time lost by their employees, many of whom were off for periods of varying length owing to the epidemic of Spanish influenza. The production is placed at about 168,006 tons while that for October was 217,482.

Following are the detailed figures for the Vancouver Island Collieries:

	November.	October.
Western Fuel Co.	$ 49,121	$ 59,219
Canadian Collieries (D) Ltd. (Comox)	27,065	47,604
Canadian Collieries (D) Ltd. (Wellington-Extension)	17,216	26,762
Pacific Coast Coal Mines	2,914	5,773
B. C. Coal Mng. Co. (Jingle Pot)	3,257	3,025
Nanoose Collieries	1,112	1,990
Granby Consolidated Mng. & Smelting Co. (Cassidy's)	2,010	2,560
Totals	$102,695	$146,933

Nicola Valley.

	November.	October.
Middlesboro Collieries	$ 6,000	$ 8,202
Fleming Coal Mng. Co.	2,695	3,280
Coalmont Collieries	616	490
Princeton Collieries (Estimated	2,000	3,327
Totals	$11,311	$15,299

Crow's Nest Pass Field.
(Estimated.)

November, 54,000 tons; October, 55,250 tons.

The total output for the year 1918 up to the end of November, therefore, is about 2,372,161 tons, or an increase over 1917 of 222,186 tons.

Diamond drilling of coal property situated near the Sable River, Vancouver Island, is to be undertaken at an early date. A road now is being constructed up the river to permit the shipment of machinery to the prospect.

The annual convention of the Northwest Mining Association will be held in Spokane, Wn., from February 10th to the 16th, 1919. Special interest will attach to the discussions because of the return to peace conditions, and it is expected that, because of the importance of the problems, the Convention will attract a large and representative attendance of mining men from both the United States and Canada.

ELECTRIC HOISTS FOR MINES—Built the way you want them

The Electric Hoist in this illustration has the drum keyed fast to the shaft. It cannot turn in any direction except it is driven by the motor. There is no possibility of accidents through worn or loose frictions. The Hoist is under absolute control of the operator at all times.

This is only one of the many styles of Mine Hoists we make. Our Catalog shows many others. Have you a copy?

We make any of our Mine Hoists for either Steam, Electric, or Belt Drive, as desired. We make them with either one or two drums, and supply any diameter of drum up to 48 inches.

In any style Hoists we give you a choice of seven sizes, 10 H.P., 15 H.P., 20 H.P., 25 H.P., 32 H.P., 40 H.P., and 50 H.P.

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Drilling For Oil in Burnaby District.

A depth of 625 feet has been reached by the drill which is being sunk for oil in the Burnaby District near Vancouver, B. C., by the Spartan Oil company. The indications are said to be very promising and oil is expected to be struck at 1,000 feet. If the company is not successful in this instance it is the intenton to sink several more holes. The engineers advising the company remain confident that oil in commercial quantities exists in this section and, development having been undertaken, it is intended to carry it through until the belief of those who are interested in the enterprise is shown to be justified or demonstrated clearly to be without foundation.

Canada Copper.

After an inspection of the Copper Mountain plant of the Canada Copper company, George O. Bradley, of Messrs. Bradley, Bruff & Lebarthe, construction engineers of San Francisco, Cal., has returned to California. He reports that satisfactory progress is being made in the installation of the plant which will have a capacity of 2,000 tons and that the 100 miles power line of the West Kootenay Pawer & Light Company probably will be completed to the camp sometime in the summer.

Le Roi No. 2.

Mr. Ernest Levy, general manager of the Le Roi No. 2 Limited (Josie), Rossland, B. C., states that that mine produced, in the fiscal year ending September 30th last, 19,000 tons of ore. "Ore has been found in the old No. 1 Mine after many years of exploration," Mr. Levy said. "The body is 200 ft. long, two and a half to three feet wide, and has been followed up for 50 ft. The grade is of the average in gold, but below the average in copper. We are breaking and shipping ore from this body.

"Sinking has been resumed in a 200 ft. winze from the 1,650 ft. level. Ore extracted below the collar of the winze compares favorably with that extracted elsewhere in the mine, especially in copper, but in both copper and gold. Conditions in the winze are encouraging.

"Operations were resumed recently after an interruption of two weeks because of influenza and are proceeding with two shifts. As health conditions improve the force will be increased and development and production engaged in continuously.

"Considerable hardship has attended mining in the last year or so. It resulted from sickness, labor troubles, and high price of materials among other things. Powder is 100 per cent higher and steel 60 per cent. We use much powder and of a high grade, as the ground is hard. Steel has been hard to get."

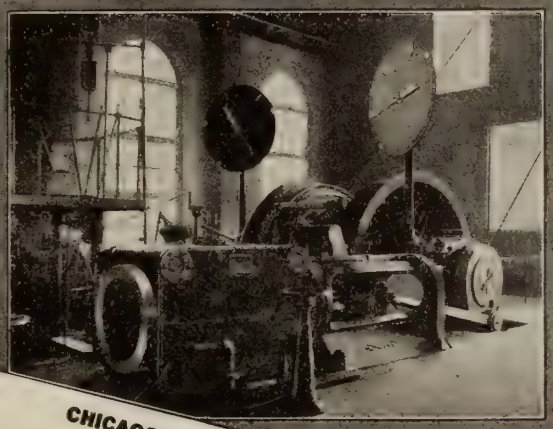
Trail Smelter.

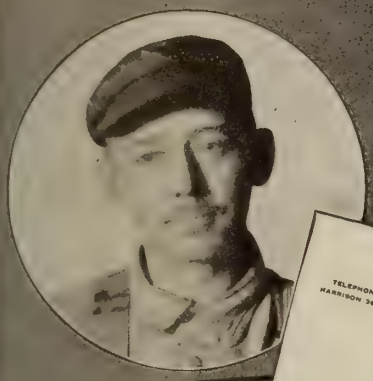
During the last week of November and the early part of December operations at the Consolidated Mining & Smelting Co's Smelter, Trail, B.C., were handicapped by scarcity of labor, many of the regular employees being laid up with influenza. Because of the epidemic the management asked shippers to cut down shipments of ore as far as possible temporarily.

New Hazelton Gold Cobalt Co.

Dalby B. Morkill, mine superintendent of the New Hazelton Gold Cobalt Company, a Vancouver corporation owning a group of claims on the Rocher de Boule Mountain, near Hazelton, B.C., expresses himself as satisfied with the results of development up to the present. Two tunnels are being driven and these will be continued. One of these is on the Victoria gold-cobalt molybdenum lead at a point 1,100 vertically below the apex of the vein, and 350 ft. below the main tunnel. This lower tunnel has now been driven 240 ft., 75 ft. being a crosscut to tap the vein and the remainder a drift along the vein. In this drift a shoot of ore 100 ft. long has been passed through, varying from two to three inches in width, which assayed, at the widest part, $109 in gold and 7 per cent cobalt. The face of the drift is now into a second shoot of ore. It was from the upper tunnel on the same lead, 750 ft. below the apex, that three carloads of ore were taken and shipped to Ottawa for treatment, the ore containing gold, cobalt and molybdenite. A 30-ton carload of ore from the same workings is now being loaded for shipment to the Granby company's smelter at Anyox. The purpose of the lower tunnel is to develop and block out the shoots of ore shown in the upper workings and to provide a lower and permanent entry to the mine. Driving on the vein will be continued during the winter and definite plans of operation made in the spring in accordance with the results of development. The other tunnel upon which work is being carried out is on one of the copper veins on the company's Moose claim, adjoining the Rocher de Boule mine. The vein is the extension, it is claimed, of that property's upper or main vein. The surface outcrop is not favorably situated for drifting upon, so a tunnel was started below the showing. It has been driven in loose ground a distance of 140 ft. and has just reached the solid formation

NORDBERG HOIST Breaks Worlds Record





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McCORMICK BUILDING
CHICAGO

November 14, 1918.

Mr. H. W. Dow, Sales Manager,
Nordberg Manufacturing Company,
Milwaukee, Wisconsin.

My dear Mr. Dow:-

Last December I wrote you regarding the performance of the 28" and 28" by 48" Nordberg hoisting engine at our Orient #1 Mine after the new cylindro-conical drum had been installed. From your interest at that time I think you would like to hear that our prediction of even better results has been realized.

Last week this Mine established a brand new hoisting record, Thursday recording the largest single day's output we have heard of for any coal mine and the week's average being higher than any single day's output for any other mine in the Southern Illinois field. The coal hoisted, prepared and loaded for shipment was -

Monday,	October 7th,	4928 tons
Tuesday,	" 8th,	5237 "
Wednesday,	" 9th,	5482 "
Thursday,	" 10th,	6008 "
Friday,	" 11th,	5355 "
Saturday,	" 12th,	5504 "
Total for week,		32,514 tons
Average per day		5,419 tons

The coal lies 520 feet below the surface, the hoisting distance from bottom of shaft to dumping point being about 600 feet. To raise the 6008 tons on Thursday it was necessary to make 1452 hoists or an average of 18½ hoists per hour, or better than 3 per minute - the pit cars averaging a little better than 4 tons of coal each. Single car, self-dumping cages.

This was remarkable hoisting, the output being very largely due to the fine action of the hoist itself which has greatly increased the capacity of this shaft.

With best regards,

Yours very truly,

President.

NORDBERG MANUFACTURING CO. MILWAUKEE

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DIVIDENDS PAID BY NORTHERN ONTARIO SILVER AND GOLD MINES.

(The following tabulation is contributed by the "Northern Miner")

Dividends paid by gold and silver mining companies operating in the District of Temiskaming, Ont., in 1918, to December 31st, are as follows:

Cobalt	$3,623,513
Porcupine	1,771,544
Kirkland Lake	100,000
Total	$5,495,058

Total dividends paid from beginning of operations to December 31, 1918:

Cobalt	$76,398,171
Porcupine	12,819,089
Kirkland Lake	491,125
	$89,708,385

Dividends declared in 1918, payable in 1919:

Cobalt	$717,430

This will bring the total for Cobalt silver mining companies to $77,115,602, and the total for the District of Temiskaming to $90,425,816.

In comparison the dividend record in 1917 was:

Cobalt	$5,454,694
Porcupine	1,759,544
Kirkland Lake	65,187
	$8,279,426

Dividends Paid by Cobalt Silver Mining Companies to December 1, 1918.

Mining Company.	P.c. paid 1918.	Amount paid, 1918.	T'l P.c. Dec. 31, 1918.	Total Amount to Dec. 31, 1918.
Alladin-Cobalt			2	$50,000
Beaver			32.5	650,000
Buffalo			282	2,787,000
Caribou-Cobalt (Drummond)			22.5	225,000
Casey-Cobalt			25	203,249
City of Cobalt			23	139,321
Cobalt Central			4¾	192,845
Cobalt Lake			15.5	465,000
Cobalt Siver Queen			21	315,000
Cobalt Townsite			97.5	966,726
Coniagas	12.5	$500,000	231	9,240,000
Crown Reserve			350	6,190,840
Kerr Lake	20	600,000	262	7,860,000
Foster			5	45,774
La Rose	2	30,000	84.5	7,221,433
McKinley-Darragh	12	269,723	241	5,415,920
Mining Corp.	81¼c	1,348,790	..	4,253,886
Nipissing	30	1,800,000	309	18,940,000
Hudson Bay			25000	1,940,250
Peterson Lake			19.25	462,350
Right of Way			14.5	244,492
Seneca-Superior			330	1,579,817
Temiskaming	3	75,000	83	2,059,156
Wettlaufer			45	637,465
Private Corporations				3,825,000
		4,623,513		76,398,171

Dividends declared by Cobalt mining companies in 1918 to be paid in 1919 follow:

Nipissing	5	$300,000
Bonus	5	300,000
McKinley-Darragh	3	67,430
Trethewey	5	50,000
Total to end of 1918		76,398,171
		$77,115,602

Dividends Paid by Porcupine Gold Mining Companies to December 31, 1918.

	P.c. paid 1918.	Amount paid, 1918.	T'l P.c. Dec. 31, 1918.	Total Amount to Dec. 31, 1918.
Dome Mines			37.5	1,500,000
Hollinger Con.	5	1,230,000	..	9,424,000
McIntyre-Porcupine	15	541,544	30	1,083,089
Porcupine Crown			42	840,000
Rea Mines			6	12,000
		$1,771,544		$12,819,189

Dividends Paid by Kirkland Lake Gold Mining Companies to December 31, 1918.

	P.c. paid 1918.	Amount paid, 1918.	T'l P.c. Dec. 31, 1918.	Total Amount to Dec. 31, 1918.
Tough Oakes			15	391,125
Lake Shore	5	100,000	5	100,000
		$100,000		$491,125

That an embargo will be put on lead ore and concentrates shipments to the Trail Smeltery is the effect of a report now in circulation. The explanation given is that there must be a hiatus until settled peace conditions are established. It is suggested that such embargo likely will remain in effect all winter.

Ore Receipts at Trail Smelter.

There is now no doubt that the receipts of ore at the smelter of the Consolidated Mining & Smelting Co., at Trail, B.C., will be less than for either of the two previous years. For the first ten months of 1916 a total of 456,692 tons of ore was received. In 1917 the total was 327,639 tons and in 1918 it amounts to 292,454 tons. For the last six months or more of 1918 the gross ore receipts at the smelter have been around 20,000 tons per month, which is about half of what they were in the month of March, 1918.

The following table of gross ore receipts at the Trail Smelter for the first ten months of the three past years is interesting for comparative purposes:

	1916.	1917.	1918.
February	37,863	40,967	33,989
March	43,810	42,949	41,735
April	41,771	25,909	37,039
May	43,031	15,969	21,162
June	42,252	17,129	17,965
July	40,268	20,744	20,871
August	46,814	38,134	23,465
September	42,863	39,293	21,765
October	40,350	49,975	26,042
November	40,709	(strike)	21,027
Totals	456,692	327,639	292,454

EDITORIAL

$220,000,000 IN 1918.

The total value of the mineral production in Canada during 1918 was probably not less than $220,000,000. The total value of the production in 1917 was $189,646,821.

The Department of Mines estimates the production of coal during 1918 at about 15,180,000 short tons, as compared with a production of 14,046,759 short tons during 1917.

The production of the more important metals during 1918 is estimated as follows, viz.: Gold, $14,750,000 in value; silver, 20,800,000 ounces; copper, 117,000,000 pounds; nickel, 91,500,000 pounds; zinc, 36,000,000 pounds; pig iron, 1,182,000 short tons; steel ingots and costings, 1,010,000 short tons.

The production of these metals in 1917 was: Gold, $15,272,992 in value; silver 22,221,276 ounces; copper, 109,227,332 pounds; nickel, 82,330,280 pounds; zinc, 29,568,764 pounds; lead, 32,576,281 pounds; pig iron, 1,170,480 short tons; steel ingots and castings, 1,745,734 short tons.

NICKEL-COPPER MINING IN CANADA.
About 45,000 Tons Nickel and 13,000 Tons Copper, Valued in Matte at $36,000,000, from Sudbury District in 1918.

The year 1918 is one of unusual interest in the nickel-copper industry of Canada. The large production of nickel-copper matte was of itself a notable accomplishment, when the shortage of labor is considered. More remarkable than this, however, was the big advance towards making Canada the world's chief source of refined nickel, as well as of matte. The Port Colborne, Ontario, refinery began operations in July, 1918, and is now producing large quantities of nickel. Another refinery is in course of construction at Descrenes, Quebec.

During the first nine months of the year 1918, the smelters at Copper Cliff and Coniston treated 1,141,089 tons of ore, producing therefrom 64,926 tons of nickel-copper matte valued at $26,925,872 containing 33,688 tons of nickel and 17,232 tons of copper. Production for the year will be about 45,000 tons nickel and 13,000 tons copper. The value of the matte produced during the year will be about $36,000,000. As a considerable amount of this matte is now being treated at the refinery of the International Nickel Co. of Canada at Port Colborne, and added value will be given that will swell this total. During 1919 a much larger portion of the matte will be refined in Canada.

The new refinery, started in July, had produced at the end of September 358,205 lb. of nickel and 359,713 lb. of copper. This is much more nickel than had previously been produced, and is the first large production of refined copper. Until July, 1918, the refined nickel produced in Ontario was a by-product from the treatment of Cobalt silver ores, which contain silver, cobalt, nickel and arsenic. All the nickel-matte from the Sudbury district formerly went abroad, most of it to the United States and the remainder to Wales. It is hoped that from now on an ever-increasing proportion of the matte will be refined in Canada.

During the war we were handicapped by the lack of refining facilities. Fortunately it was found possible to prevent nickel from going to our enemies during the war; but we were not in a very strong position, owing to the necessity of exporting our matte in order to have it refined. We will not likely ever be in that position again.

At the mines and smelters the shortage of men has naturally necessitated that attention be specially given to maintaining output at as near capacity as possible. Nevertheless, improvements have been made during the war that will make more efficient operations in the years ahead. The Sudbury nickel-copper industry continues to grow and the operating companies can look forward to a long and prosperous life. Nickel and copper have, of course, been recently chiefly in demand for war purposes; but nickel and copper have a variety of uses that insure a big demand in peace times also. The cessation of war orders will necessitate more attention being given to markets; but we have no doubt that markets will be found.

ARE WE MAKING THE MOST OF OUR OPPORTUNITY?

Next to agriculture, mining is Canada's greatest basic industry. It is from the mines that we obtain our fuels, much of the material used in manufactures, and for building materials. Next to food, the mine products were the most necessary things used by our valiant soldiers in winning the war. Like food, mine products will be very necessary during the period of reconstruction. The Canadians who interest themselves in mining have good reason to believe that our mining industry will expand enormously if carefully handled during the coming years. They believe that rapid development of our mineral resources will help to make the Dominion prosperous. They know that Canada has natural resources

which place her in a very advantageous position now. They appreciate also that the mere having of these resources will not avail us much unless we proceed with development more rapidly than ever. Ore in the ground on undeveloped property is of comparatively little value. The benefits it can give come only with the expenditure of capital and labor. The sooner we can find the necessary money and men to develop our mineral resources the greater will be their value as a source of wealth to the country.

The Right Honourable Lloyd George, in proposing peace terms before the Trades and Labour Council of Great Britain, said: "Economical conditions at the end of the war will be in the highest degree difficult, owing to the diversion of human effort to warlike pursuits. There must follow a shortage of raw materials, which will increase the longer the war lasts, and it is inevitable that those countries which have control of raw materials will desire to help themselves and their friends first. Apart from this, whatever settlement is made, will be suitable only to the circumstances under which it is made, and as those circumstances change, changes in the settlement will be called for."

Alfred Ballin, organizer and administrator of the German shipping trust in a recent letter to Dr. Ratheman, of Berlin, remarked as follows: "You do not believe in the silly assertion that after the war these British markets for raw materials will be open to us? What a prospect! Out of the British Empire are produced countless articles on which we have hitherto relied and which will be indispensable in the future if we are to swim and not to sink."

We have the raw materials. We have the opinion of well informed men that the possession of these raw materials puts us in a peculiarly fortunate position. To derive the advantage which this position gives us it is essential that we proceed at once to use these materials. We do not conserve by neglect to use. We do not help to pay the interest on Government bonds when we leave potentially valuable ores in the ground. We should speed up development. We should recover more gold from the ground and put that gold to work; it yields no interest in the form of undeveloped ore.

Much progress has been made in developing our mineral resources in recent years. The value of our production of minerals for the year 1918 was about twenty times that of the year 1886. The value per capita last year was about ten times that of 1886. Nearly every year since 1886 there has been both an increase in value and per capita. Our production at the present is at the rate of about $200,000,000 annually. Much of this product of the mines is manufactured in Canada into a countless variety of useful things, thereby increasing in value by many millions of dollars.

We should, however, not be content with this record. We should awaken to the fact that we are proceeding too slowly. There is much good work being done by operators and by Government departments; but we need more workers and more encouragement for them.

A FAIR DAYS WORK FOR A FAIR DAYS PAY

Steps have been taken by the management of the Consolidated Mining & Smelting Co. to secure the cooperation of its officials and men at Trail, B.C., in meeting and tiding over the period of slackness which it is foreseen must be expected if the present unsatisfactory condition of the metal market continues. Two employees from each of the nine departments of the smelting and refining works were called into conference recently by the assistant manager, Mr. S. G. Blaylock. At this conference the future was frankly discussed, and it was pointed out by the management that it would be necessary for all identified with the industry to work together in the determination to maintain the highest degree of efficiency if the conditions likely to be encountered in the immediate future were to be satisfactorily overcome. Mr. Blaylock explained to the men that the company wished to continue in operation as long as the metal situation would permit. Parts of the plant might at times be temporarily idle but, with the maintenance of efficiency, other work would be found for the men, possibly along the line of construction. All he asked for was a fair day's work for a fair day's pay, and he would leave it to the conscience of each one to decide whether such was being rendered. Questions were asked by the men's representatives relative to the prospects, and answered as fully as the information available permitted. The discussion concluded with a complete understanding between management and the men, and it is confidently believed that the two will work together amicably and enthusiastically to the end that the difficulties expected may be tided over without recourse to any drastic measures.

PORT ARTHUR WANTS IRON AND STEEL WORKS.

The granting by the Dominion Government of 50 cents a ton bounty on all iron mined and smelted in Canada and the establishment, by authority and with the support of the Federal Administration, of a large blast furnace and steel plant at or near the city of Port Arthur, Lake Superior, are two important petitions to be laid before Premier Borden and his colleagues at an early date by the people of the district of Port Arthur.

Arguments for the granting of a bounty are enumerated as follows:

That during the last decade over 90 per cent of the product of the Canadian furnaces was from im-

ported ore, of which 58 per cent came from the United States Lake Superior mines and 41.9 per cent from the Newfoundland mines.

That the proportion of domestion iron ore smelted in Canada has gradually declined until in 1917 it was only 4.23 per cent.

That the iron ores of Canada are sufficiently known to warrant the statement that there is a large tonnage that could be made available for use by some preliminary treatment, if the increased cost of such treatment were compensated for by a bounty, as the ores of the Atikokam Range require roasting, Loon Lake ores hand sorting, Magpie siderite ores calcining, and Moose Mountain and Bathurst ores concentrating.

That extensive areas of promising iron formations have been located in many parts of Canada and it is reasonable to expect that the concentrations of merchantable ore will be found in these ranges when systematically exploited, especially on the Steep Rock, Mattewan, Kaministiquia, Nipigon, Little Long Lake and Michipicoten district.

That the granting of a bounty on iron ore would stimulate the prospecting of these areas, and probably secure the active operation of several mines already developed and equipped at a heavy expenditure in Northern Ontario and provide remunerative freight traffic to several sections of the Canadian Government railways that are at present apparently unproductive.

That the increased employment of mine operators, explorers and transportation employees, together with the general development of the iron mining districts, would so materially increase the customs receipts of Canada that the proposed bounty would be a very small tax (if any) on the finances of the Dominion.

Some of the points made in support of the plea for a Dominion Blast Furnace and Steel Plant are:

That practically all the steel plants in the Dominion are in Eastern Canada and have received $16,000,000 in bounties.

That between 1905 and 1915 Canada imported iron and steel products to the value of about $632,000,000.

That the population of Western Canada is now over 2,000,000 and in ten years has increased 174 per cent, whereas that of Eastern Canada has increased only 17 per cent.

That there are about 19,000 miles of railway in Western Canada radiating westward from the City of Port Arthur and manufacturing plants representing over $308,000,000.

That the United States Steel Company some years ago erected a large steel plant at Duluth at a cost of over $25,000,000 to supply the requirements of the Western States and is about to proceed with the erection of additional mills at a cost of approximately $15,000,000.

The policy recommended to the Dominion Government in the launching of the proposed industry is that the cost be placed at about $15,000,000 and that the interest for thirty years on eighty per cent of the actual capital invested be guaranteed or that the same guarantees be allowed as have been given to Canadian dry docks and shipbuilding plants to the extent of about $13,000,000.

VANCOUVER BOARD OF TRADE ASKS FOR ORE TESTING PLANT.

A petition that an ore testing plant be established in British Columbia, and that the drilling of the placer ground of the Tulameen River be continued will be presented to the Dominion Government by the mining Bureau of the Vancouver Board of Trade. The same organization proposes asking the Provincial Government for an explanation of its failure to diamond drill iron properties of the Province in order to arrive at an estimate of the available tonnage of magnetite and hematite ores.

With respect to the ore testing plant it is asserted that British Columbia operators are handicapped because they have to send sample shipments to Ottawa for treatment, a procedure which is both costly and slow. The type of plant required would cost only about $75,000, it is stated, and such an expenditure would be amply repaid in benefit to the mining men and the industry.

As to the Tulameen platinum operations it will be pointed out that during the past three months fourteen holes have been drilled and that the showings obtained fully warrant further prospecting. To discontinue the work now, it is argued, would be wasteful and unjustified. It has been demonstrated that this valuable mineral exists in the placer ground and the commercial possibilities of the resource should be determined before the work is abandoned.

It also was felt that no further time should be lost by the Provincial Government in taking action towards obtaining exact and authoritative information on the iron ore deposits of the Province.

P. B. Freeland, Resident Mining Engineer for the British Columbia Government, with headquarters at Grand Forks, B.C., who formerly was with the Granby Consolidated Mining & Smelting Co., was married recently at Vancouver, his bride being Miss Mary Bagley, of that city.

Mining Convention in Vancouver in March.

An International Mining Convention will be held in Vancouver (B.C.), sometime during the month of March, 1919. It had been proposed that this gathering should be called for January, but a postponement to the latter date has been agreed upon by the members of the Vancouver Chamber of Mines. The Convention has the endorsation of Hon. Wm. Sloan, Minister of Mines, and the Resident Mining Engineers of the various mining districts of the Province are expected to take an active part. The proceedings are likely to be of special importance, because of the problems which will come up for consideration.

Imperial Mineral Resources Bureau, London, Eng.

When the war came on the British Empire found that the enemy had more or less complete control of certain mineral industries of vital importance. Germany had been importing minerals and ores from various parts of the British Empire, refining them, and, in some cases, selling a part of the refined materials to the British. Early in the war it was found that while certain minerals and ores could be produced in quantity, facilities for refining them were either entirely lacking or were inadequate. It was decided that this state of things should not be allowed to continue, and great advances in metallurgy and the mineral industry generally, have been made in Britain during the war. The Scientific Products Exhibition held in King's College, Strand, August 12th to September 7th, 1918, and that of the Key Industries in Central Hall, Westminster, some weeks later, were illuminating as to the independence Britain now occupies.

Imperial Mineral Resources Bureau.

On the subject of the Empire's Mineral Resources, the Imperial War Conference, at its sittings in June and July, 1918, dealt with the following Memorandum prepared by the Minister of Reconstruction:—

1. In accordance with Resolution No. XIII of the Imperial War Conference, 1917, and following the report of a Special Committee presided over by Sir James Stevenson, steps have now been taken to establish the Imperial Mineral Resources Bureau.

2. In accordance with the recommendations for the constitution of the Governing Body contained in Sir James Stevenson's Report, the following representatives have been nominated on behalf of the Governments concerned:—

Chairman of the Governing Body (and Representative of the United Kingdom): Sir Richard Redmayne, K.C.B..
Canada: Dr. Willet G. Miller.
Commonwealth of Australia: Mr. W. S. Robinson.
New Zealand: Mr. Thomas Hutchinson Hamer.
Union of South Africa: The Right Hon. W. P. Schreiner, C.M.G.
Newfoundland: The Right Hon. Lord Morris, K.C.M.G.
India: Mr. R. D. Oldham, F.R.S.
Colonies and Protectorates: Mr. J. W. Evans, D.Sc., LL.B.

3. As regards the proposed representatives of mineral, mining, and metal industries, owing to the magnitude and complexity of the interests involved and the obvious desirability of having at the disposal of the Governing Body the best expert knowledge available, it is desired to increase the number of these representatives to six instead of the four originally recommended in Sir J. Stevenson's Report, to which the Dominion Governments have agreed. If this is accepted by the participating Governments it is proposed to nominate the following:—

Westgarth Forster Brown, Esq. (A leading consulting mining engineer, especially in regard to coal and coal mining; Mineral Adviser to His Majesty's Woods and Forests; Deputy Gaveller of the Forest of Dean, with experience in many Colonies.)

Professor H. C. H. Carpenter. (President of the Institute of Metals; Professor of Metallurgy in the Royal School of Mines.)

Dr. F. H. Hatch. (Ex-President of the Institution of Mining and Metallurgy; now advising the Ministry of Munitions on iron ore supplies. Has world-wide experience in metalliferous mining, and is a member of the Mineral Resources Advisory Committee of the Imperial Institute.)

Sir Lionel Phillips, Bart. (The well-known authority on South African mining; formerly President of the Chamber of Mines, now Comptroller of the Mineral Resources Development Department, Ministry of Munitions.)

Edgar Taylor, Esq. (Of Messrs. John Taylor and Sons; retiring President of the Institute of Mining and Metallurgy; an authority on gold mining.)

Wallace Thorneycroft, Esq. (President of the Institution of Mining Engineers; an authority on questions of iron mining and working.)

4. It is desirable to submit to the present Imperial War Conference proposals as to the position of the Bureau and its status in the machinery of Government.

The duties of the Bureau are thus defined in Resolution XIII, passed by the Imperial War Conference on the 23rd April, 1917:—

> "The Bureau should be charged with the duties of collection of information from the appropriate departments of the Governments concerned, and other sources, regarding the mineral resources and the metal requirements of the Empire, and of advising from time to time what action, if any, may appear desirable to enable such resources to be developed and made available to meet the metal requirements of the Empire."

This definition is expanded, as follows, by Sir James Stevenson's Committee:—

> "(a) To collect, co-ordinate, and disseminate information as to resources, production, treatment, consumption, and requirements of every mineral and metal of economic value.
> "(b) To ascertain the scope of the existing agencies, with a view ultimately to avoid any necessary overlapping that may prevail.
> "(c) To devise means whereby the existing agencies can, if necessary, be assisted and improved in the accomplishment of their respective tasks.
> "(d) To supplement those agencies, if necessary, in order to obtain any information not now collected which may be required for the purposes of the Bureau.
> "(e) To advise on the development of the mineral resources of the Empire or of particular parts thereof, in order that such resources may be made available for the purposes of Imperial defence or industry."

5. The constitution, as suggested by Sir James Stevenson's Committee, is as follows:

> "The administration of the Bureau should be controlled by a Governing Body representing the various parts of the Empire, as well as the mineral, mining, and metal industries. This body should be responsible for the appointment of a Director, or such other official or officials as may

be considered desirable, and the necessary subordinate staff, within the limits of the funds available for administrative expenses."

The Committee further suggested that the expenses of maintenance of the Bureau (being a sum not exceeding, for the first year of existence, £10,000 per annum) should, for the time being, be voted by the Imperial Parliament, on the advice of the Minister of Reconstruction, although the view was held by some of the Committee that from the outset direct contributions to the maintenance of the Bureau should be borne by all the Governments concerned.

6. It is proposed that the Bureau should be granted Incorporation by Royal Charter, which should define the constitution and the duties of the Bureau. The Governing Body will be established on the lines laid down by Sir J. Stevenson's Committee, with such alterations as may be approved by the Imperial War Conference.

7. As to expenditure, each Government would, of course, pay the expenses of its own representative. The normal expenditure of the Bureau would be met out of funds contributed by the Imperial Government, as suggested in the Report of Sir James Stevenson's Committee, together with such contributions from the Oversea Governments as they may, by agreement, be prepared to make.

This arrangement shall continue for three years, before the end of which time the question as to the contribution to be made by the Oversea Governments shall be brought up for discussion at an Imperial Conference.

8. Power should be given in the Charter to hold and deal with moneys which would be placed at the disposal of the Bureau by way of grants in aid contributed by the Imperial and Oversea Governments. Annual reports on the work of the Bureau shall be made to each of the Governments concerned.

Resolution XVI.

The resolution made was in the following terms:—

The Imperial War Conference, having considered the memorandum by the Minister of Reconstruction on the Imperial Mineral Resources Bureau, as amended, agrees that the number of representatives of the mineral, mining, and metal industries on the Governing Body of the Bureau should be increased from four (as originally agreed) to six. The Conference further approves the proposal for a Charter of Incorporation as set out in paragraph 6 of the memorandum and the proposals in paragraphs 7 and 8 as to the allocation of expenditure.

In accordance with the recommendation of the Conference the organization of the Bureau has been proceeded with and a charter applied for. Meetings of the Board of Governors, whose names are given above, have been held periodically, and committees on organization, finance, etc., have been at work. Thus far the meetings have been held in the Ministry of Reconstruction, but it is hoped that the Bureau will soon have a home of its own, probably in the vicinity of the Strand or Kingsway. It is already evident that there is much important work waiting to be undertaken by the Bureau which can be of great service to the Empire.

Mr. A. L. Larsen, until recently draftsman for the Consolidated Mining & Smelting Co., at Trail, B. C., is leaving for San Francisco, where he has been appointed to a position with a metallurgical concern.

COAL MINERS DID THEIR SHARE OF WAR WORK.

In discussing the contributions made by the different coal mining centres of British Columbia towards winning the war the labor paper of British Columbia, in a recent issue, gives figures and mentions many individual instances which indicate that the records of all these communities has been all that could be desired.

Introducing the article in question the editor says: "At the commencement of the war it will be remembered that the conditions in the mining industry, in common with many others, were somewhat parlous. Hundreds of long resident miners had already departed for other fields and many to other countries. In addition to these facts the call from Britain for industrial workers was readily responded to, and the commissioners enrolled men freely from the mining camps for this purpose. Many aliens have been introduced into British Columbia, and, particularly on the Island (Vancouver Island), the Asiatic miners have replaced the white by hundreds. Therefore any comparisons of number of enlistments to miners employed would be completely misleading unless these facts are also considered in connection with the very incomplete returns from the whole of the province."

Officials of District 18, U.M.W. of A., which includes Eastern British Columbia and Alberta coal fields, are mentioned as follows:

John Larson, of Lethbridge, a member of the district executive board when he enlisted, who was killed in action.

Jack Price, an active member of the local union of the district, and a candidate at one time for the office of President, who went to the front and made the supreme sacrifice for his country.

Clement Stubbs, a former president of District 18, who was granted a commission and served as a lieutenant. He was twice wounded, but has come through some of the most severe actions with his life. He is a brilliant orator, and his return is looked forward to by fellow workmen, it being anticipated that he will resume a leading place in the counsels and the activities of the labor movement of western Canada.

Then there was W. L. Phillips, another ex-president of District 18, who was killed while on service.

After mentioning specially many of the residents of the City of Fernie, who gave their lives, and printing a long list of the members of Gladstone Local Union No. 2314 who enlisted, some of whose names are numbered among casualties who never will be seen again and others of whom are expected back shortly, Tom Blairmore and "Old" Bill Archer are referred to. They went away with a Tunnelling Corps. Both were well-known and popular, besides being prominent in labor circles; "Bill" returned with rheumatism, only to be killed in one of the Blairmore Mines two days after he went back to work.

The coal miners of Michel, B.C., are credited with having sent one-third of their numbers to the war, the total being 98 men, while from South Wellington, Vancouver Island, there went over forty of the union members. No roll was kept of the number of enlistments from the Cumberland District, Canadian Collieries, Ltd., but it is estimated that at least 300 went overseas. The Nanaimo Mines contributed proportionately.

OPPORTUNITIES FOR PROSPECTORS IN THE COUNTRY TRAVERSED BY THE PACIFIC GREAT EASTERN RY.

In a report just issued by the Geological Survey Branch of the Department of Mines, Ottawa, Mr. Charles Camsell, director of the British Columbia Station, gives an interesting and instructive account of a reconnaisance of the country in British Columbia, through which the Pacific Great Eastern Ry. passes.

After pointing out that the principal mineral deposits of the province are associated with Jura-Triassic rocks he states that the most important occurrences of these rocks along the route of the railway are: The Birken Bank, extending from north of Anderson Lake to Birkenhead River; Pemberton Band, lying between Spetch and Pemberton; the Mons Band, extending from Green Lake to Cheakamus River; while smaller bands are found at Watson, Brew and Bethel. These localities, therefore, are of special interest to prospectors.

"These conditions," Mr. Camsell continues "are most favorable for the occurrence of metallic deposits of copper, lead, zinc, gold and silver, and the whole interior of the coast mountains of British Columbia, therefore, becomes an excellent field for prospecting, and not only the eastern and western borders as was formerly believed to be the case. Fortunately the magnificent system of deep fiords that cut deeply into the heart of the ranges makes it possible to prospect for these bands of stratified rocks and to easily develop any ore deposits that may be found in them. Prospectors, therefore, are urged to pay more attention to the coast mountains than they formerly did."

Referring to the deposit of limonite at Alta Lake, which is now being developed for the purpose of supplying a fluxing material for the Irondale Wn. Smelter, Mr. Camsell states that it covers an area of 60,000 sq. ft., with a length of 450 ft. and a width of 250 ft. Analysis is given of 40.98 to 48 per cent metallic iron; 0.2 per cent to 1.80 per cent sulphur; 0.1 to 1.88 per cent phosphorous; and 1.24 to 2.2 per cent silica. Other small deposits of similar ore occur in the neighbourhood, originating from the decomposition of pyrite bearing rocks.

An examination also was made by Mr. Camsell of the district adjacent to the headwaters of the Indian River, where several claims have been located east of the Britannia Mine ore zone. He considers most of the deposits of a character different from that of the Britannia. A band of stratified rocks a mile or more in width extends along the valleys of the Indian and Stamish Rivers. These rocks are surrounded by the granite batholith and intersected by numerous dykes.

On the Belle group are four outcrops of ore which are respectively four feet, seven feet, ten feet, and thirty feet in width, and from which samples are said to average 3 per cent copper. The Bullfondale group is located on an extension of the same ore zone as the Belle. The London group has a large iron-stained outcrop in granodiorite, through which the pyrite is abundantly disseminated with a little chalcopyrite and some molygdenite. The Roy group was purchased last spring by the Britannia Mining & Smelting Co. for $25,000 cash, and Mr. Camsell found on this group copper ore of high grade covering a surface area of 2,300 square feet. Bunches of pure chalcopyrite are common. Development consists of stripping and diamond drilling.

Mr. F. M. Bancroft, of the Geological Survey, makes a summary report on the Slocan District in which connection he refers to the Manganese Deposits near Kaslo, B.C., and points out that the primary silicate, rhodonite, occurs in Ainsworth, Yale and Kamloops mining divisions. A close search, it is suggested, should be made for ores of zinc and superficial ores of manganese in the vicinity of these deposits. The mineral occurs near Kaslo in a vein three feet to four feet wide, between graphic schist and chlorite schist and is due to hydrothermal solutions occurring along a contact fissure.

The secondary deposits of manganese near Kaslo are declared to be the most notable yet discovered in British Columbia, the grade being good and averaging 48.14 per cent manganese and 1.65 metallic iron.

With reference to the Lardeau Mining Division, Mr. Bancroft states that the surface indications in the Lardeau Valley and through the whole central mineral belt are good and merit more intelligent investigation for gold, while the mineralization compares favorably with that of Sheep Creek, Ymir, Nelson and Bridge River. There are silver-lead deposits at the head of Cascade, Poplar, Tenderfoot and Mobbs Creeks. Manganese, tin, platinum and nickel are to be regarded as minerals of possible importance in this district and it is pointed out that pyrrhotite from the Queen Victoria mine at Beasley, west of Nelson, carried 0.41 per cent nickel.

Lorne Mine, Cadwallader Creek.

One of the promising gold properties of the Cadwallader Creek District, Kamloops Mining Division, is the Lorne Mine. During the past year, owing to labor scarcity and the comparatively low value of gold, the work has been confined largely to development. From development there were milled about 380 tons of rock yielding 192 oz. gold and 37 oz. silver.

Pioneer Mine.

The Pioneer Mine is another gold property of Cadwallader Creek which has been operated steadily during the greater part of the past year. Milling was started on the 10th March last and ceased on the 21st of July following. The sinking of a shaft was continued from the latter date, and now is down 280 feet from the collar. Drifting has been carried on at the 280 foot level for 120 feet and good values are shown. Headgear, hoist house and blacksmith shop were destroyed by fire on November 17th, but milling is expected to recommence in a short time. Gold produced during the year up to the 16th November totals 1,925 ozs., and it is estimated that the output to the end of the year will aggregate 2,500 ozs.

Plant Installed at Ida May Mine.

At the Ida May Mine, also situated in the Cadwallader Creek District, a reduction plant consisting of a small jaw crusher, a Huntington Mill, with a capacity of 10 tons every 24 hours, and an amalgamating table were installed during the past year. Power is supplied by a 10 h.p. gasoline engine. In a trial run 30 oz. of gold was secured. The property now is closed down, but it is expected that it will be again operated in the spring.

Mr. F. H. Hawkins, who for several years past has held the position of Chief Assayer for the Standard-Silver Lead Mining Co. of Silverton, B.C., has gone to Anyox, B.C., to accept a situation with the Granby Consolidated Mining & Smelting Co. Mr. Thomas Brown will succeed Mr. Hawkins at the Silverton Assay Office.

Shell Company Would Explore Northern Alberta for Oil

A story comes from Ottawa, by way of Winnipeg, which has aroused considerable comment and even excitement in the Canadian west. It is to the effect that a British corporation, the Shell Transport and Trading Company, Limited, is to be given a blanket concession to enter upon and develop all the oil-bearing lands of Canada lying in the Province of Alberta and north of the Athabasca River. The company is to have a free swing for five years to investigate the geological conditions of this vast territory and develop the same. The concession is to be in the nature of a vast monopoly, except that the rights of prospectors and lease-holders already on the ground are to be respected. The company is to do the exploration and development work at its own expense. The oil thus produced is to be handled by the company, which agrees to pipe it to the head of the lakes or to Vancouver. The company is to have a return of six per cent upon its investment, and the remaining profits are to be divided on a fifty-fifty basis between the oil company and the Dominion Government.

The story is substantially set forth in a despatch from Ottawa to The Manitoba Free Press, the leading newspaper of western Canada and a staunch supporter of the Union government. The Free Press correspondent says that the initial negotiations were conducted last summer in England between the directors of the Shell Transport and Trading Company, Limited, on the one hand, and on the other hand by Sir Robert Borden, Hon. N. W. Rowell, Hon. Arthur Meighen and Hon. J. A. Calder, representing the Dominion Government. No conclusion was thus arrived at, but the proposal is not said to be under consideration by the cabinet at Ottawa, and a devision is expected at an early date.

In justification of the proposed concession, it is stated that the vast oil-bearing lands of Alberta, are not being developed as they should be, and that the only oil company in Canada of sufficient financial strength to undertake their development is the Imperial Oil Company, a subsidiary of the Standard Oil Company of the United States. It is felt that the vast deposits of oil north of the Athabasca should be kept under British control and that if not developed by the Dominion Government as a national undertaking its development should be entrusted to a British corporation. The Shell Transport and Trading Company, Limited, has a capital of fifty million dollars and has large holdings in oil and concessions for the development of the same in Rumania, Egypt, Borneo, Sarawak and the United States.

The Ottawa correspondent of The Free Press evidently considers the proposed bargain to be a good thing, and in the course of his despatch says: "Under the present system of oil exploration in the Dominion private individuals may secure a lease on 1,900 acres. They have little in the nature of expert geological recommendations to go upon. Moreover, if they do strike oil the problem of refining it and bringing it to market is still to be faced. There would appear to be only one company in the Dominion capable of meeting that problem at the present time, namely, The Imperial Oil. But there are no indications that that company desires to embark upon Canadian oil exploitation in the west. The Shell Company undertakes, if oil is found, to establish refineries and to undertake the piping of the oil to the head of the lakes or to Vancouver. The proposal has but recently come before the cabinet. It is under consideration now and a decision one way or another may be expected at an early date."—Toronto World.

H. H. STEVENS URGES GOVERNMENT OWNERSHIP OF SMELTERS AND REFINERIES IN BRITISH COLUMBIA.

Government ownership of smelters and refineries is advocated by Mr. H. H. Stevens, member of the Canadian House of Commons for Vancouver, B.C. Discussing the possibility of the development of a large metal manufacture trade in the Pacific Northwest, Mr. Stevens said that it was a matter which he had taken up with the Dominion Government, and with experts retained by the government. "In my opinion," he said, "we must begin, in British Columbia, with copper, zinc and lead. The first two are essential to the manufacture of brass. There is not only the home market in Canada, but a huge trade to be developed in the Orient in all kinds of metal manufacture." The raw materials were to be obtained by the establishment by the Dominion Government from its own smelters and refineries on this coast. Concerning the ore supplies necessary, he stated:

"As the mineral resources and their administration are under control of the Province, the co-operation of the Provincial Government would be necessary. As a carollary to the establishment of a Dominion smelter and refinery it would be necessary for the Provincial Government to impose such restrictions on the export of ore as would tend to direct these supplies to the Dominion smelter and refinery. It goes without saying that the smelter would have to give terms equal to those of the present smelters on the coast.

"As everyone knows, all the big mines and smelters except those of Trail, B.C., are owned by the American 'Copper Ring.' And even Trail is in the hands of the 'Ring' when it comes to marketing its product.

"The effect of a smelter operated in Vancouver would be to break the monopoly of the American 'Ring' as far as the metals of this Province are concerned. The Government could carry its product until market conditions were favorable, which might not be possible with a privately owned concern.

"No doubt, too, the establishment of such a smelter would result in the development of many new mines up the coast, and the extension of those now opened up as a constant market for their ores would be provided.

"Australia, Japan, China and all the other trans-Pacific countries use large quantities of manufactured metals, purchased largely in the United States. Our own raw metals go into those manufactures and American manufacturers derive the trade and the profit.

"The question of a smelter is now before the Government, backed by all the members from British Columbia and it will likely be brought up in the House of Commons during the coming session."

The Mining Convention, which was to have been held in Vancouver, B.C., under the auspices of the Vancouver Chamber of Mines during the first week in January, 1919, has been postponed indefinitely.

Rossiter W. Raymond

Secretary Emeritus, American Institute of Mining Engineers.

Dr. Raymond, to whom the term dean of mining engineers was fitly applied, passed away at his home in Brooklyn, N.Y., on Tuesday, December 31st. While the American Institute of Mining Engineers, with its world-wide membership, will always remain a monument to his genius, he was no narrow specialist. He was not only a great mining engineer, especially in the services rendered by him to the jurisprudence of mining, but was one of the greatest authors and one of the most eloquent speakers of his or any other generation in the technical world. At the dinner given by his friends in commemoration of his seventieth birthday, in New York, in 1910, Dr. Raymond's activities were epitomized by his pastor, the Rev. Dr. Lyman Abbott, of Plymouth Church, the successor of the great Beecher, as those of "sailor, soldier, engineer, writer, author, teacher, biblical critic."

Dr. Raymond was born in 1840, and when 18 years of age he set sail for Europe as a student. He became a recognized mariner before landing . . . .

"The good old Black Ball liner 'Great Western,' on which I embarked as a passenger in 1858, and became the third mate before the long, disastrous voyage was over, and the crippled vessel, with half a rig and half a crew, and on half allowance of water, crawled down the Irish Channel to reach Liverpool, and surprise the underwriters.

"After that initial unforeseen experience, I was brought by sea and land into contact with many peoples and many literatures, in scenes of peace and scenes of war; and I can now see that I unconsciously obeyed the maxim of Browning,

'Get thy tools ready,
God will find thee work.'

So that, when my work came to me, I was, without my own prevision or predecision, prepared to understand it, to love it, and, up to the measure of my strength, to do it."

From 1861 to 1864, Dr. Raymond served in the Union army in the great civil conflict.

A well known poem by Dr. Raymond is entitled The Grand Canyon, "the first line of which declares the great truth that the thoughts of God are on earth expressed."

As an author and critic, outside the domain of mining, it has been said, "Dr. Raymond has written excellent stories and his commentary on the Book of Job is a fine piece of biblical criticism."

Many writers, with more facile pens than ours, will describe Dr. Raymond's accomplishments and his achievements. We cannot do better for Canadian readers than to give quotations from speeches made by him in this country. They are messages to us which apply as well to-day as when they were delivered. Furthermore they illustrate Dr. Raymond's style as a speaker and a writer and his breadth of view.

During the last twenty-five years, under direction of Dr. Raymond as secretary, the American Institute of Mining Engineers has honored Canada by holding four meetings in this country. The term American, in so far as the Institute is concerned, as Dr. Raymond was fond of emphasizing, means North American, and does not apply merely to the territory south of the Great Lakes. The Institute has always had an active membership in Canada and this country has almost always been represented on its Council or Board of Directors.

In 1893, the Institute met in Montreal, with excursions in the adjacent parts of Quebec. In 1900 Quebec and Nova Scotia were visited. The British Columbia meeting of 1905 included an excursion to the Yukon. The mining men of Ontario had the pleasure of acting as hosts in 1907, the sessions being held in Toronto, with excursions to Northern Ontario.

At the meeting in 1900 the reverend Dr. James Douglas was President of the Institute. The following is from a speech at Sydney during that meeting by Dr. Raymond, with which most of us will agree as to the great benefits, other than technical, that are derived from membership in such societies as the A.I.M.E.

"I have been connected with the American Institute since 1871; it then had thirteen members, but it now has three thousand. If you come to any meeting of that Society and think that by sitting down in a hall and hearing some papers read you have struck the heart of that society you make a huge mistake. It is on the train, in the wagon, at the hotel over the evening pipe—I am afraid sometimes it is over the evening hot Scotch—that you will find the real work of that Institute going on. We learn more in our interchange of reciprocal feelings, we teach more in our talks, in our clasping of hands, in our social intercourse, than we do on the printed page . . . . It is not a question of piling up statistics as a permanent record, but it is a question of welding these people who do things into a social, harmonious and organized institution. Our institution was the first on this continent to do that on a large scale, and these societies of ours have welded together a great profession and made it a great factor for happiness and prosperity and knowledge among men. That is why I like to hold meetings anywhere."

At the Toronto meeting a reception was given by the Government in the parliament buildings to the members of the Institute and their guests. Adjournment was made to the legislative chamber, where several addresses were delivered. A part of Dr. Raymond's speech on that occasion may be quoted:

"I have spoken a good many times on Canadian soil. Some of you remember that in Vancouver, two years ago, I paid a hearty tribute to the achievements of Canadian engineers; and some may recall my address on the same subject, made in 1889, at Ottawa, in the presence of that great man—great man, I say, whatever party judges him!—Sir John Macdonald. I could only repeat to-night what I have said before, but with added emphasis. Years ago, I supposed that the conquest of this continent had been completed. I remember being very eloquent, somewhere or other, about the way in which the American mining engineer went on into the wilderness; and how Nature, which had lain for thousands of years in sleep and solitude and silence, like the Beauty in the fairy tale, woke at his coming, and rose, and smiled and gave herself to him, with all the glory of her beauty, and all the bounty of her treasure. Oh, I was very eloquent about that! I thought it had all been done; and that we had done it—we Americans; and I told the

young men of my generation that they might yet achieve great things, but not so great as the achievement of their fathers; that they might live to see wonderful epochs in human history, but there would be no future age like that, because there were no more worlds to conquer. The 'winning of the West' I thought we had completed. But lo! here was another empire in the North; and that world, too, our fair Canadian brethren are conquering. All hail to them! May they do better than we have done! But let them never forget that we and they follow a common purpose and share a common glory!

Among the numerous biographical notices of departed members of the Institute that Dr. Raymond wrote, quotations from one are especially appropriate at the present time. Many young men are now returning to Canada from the Great War, as did Dr. Raymond, and the subject of his sketch from the great strife nearly 55 years ago. Many of our young men have had their school and college courses interrupted, and will now find it hard to take up their work again. Will there not be encouragement for them in the life of one who, in the long ago, like them faced similar difficult conditions and triumphantly overcame them!

"Upon his discharge in 1865, he returned at once to his rural home and took up his life again, just where he had laid it aside. I had almost written 'laid it down'—and if I had done so, I could have defied the critic, and the proofreader, for he had as truly laid it down as if the sacrifice had been accepted and ratified by death. That the life thus freely offered was returned to him, did not impair the completeness of the sacrifice. His escape from the death he had dared was only a Voice which said, 'I have further use for thee!' So, at least, I understand it; and so, at least, did he! And I must add here, as a part of my picture of the man, that he never 'traveled' on his military record. He did not run for office on the strength of his army service, or urge it as a claim to civil distinction or preference. I think he regarded it as an episode, such as every good citizen should meet like a man—without bragging about it afterwards. I think he would as soon have paraded his honesty as his patriotism. Such things, in his view, 'go without saying,'

"So the crippled veteran of 23 went back to the Oxford Academy to prepare for college, with nothing to show in that line for the three years he had lost except when he had managed, in camp, to get out of his Latin grammar and reader, and, possibly, also a certain amount of fidelity, patience, and indomitable perseverence and courage, which had been both revealed and trained in the service of his country. And in 1867, as a man of 25 years, he modestly entered the Freshman class at Yale, along with a host of youngsters, who had not wasted any time in soldiering. Moreover, he did not cut short his college course on the ground that so much time had been lost, but went through the whole of it, shirking nothing, just as if it had been simply another campaign, and finally, in 1871, he took his degree as A.B. with his class."

. . . .

"At this point, I would pause again to call attention to the exceptional character of this example. Here is a man who has become 32 years old before entering upon his professional work. The delay has been due to intervals of three years and one year, sacrificed by the man himself, at the call of what he deemed higher duty—the first to patriotism, the second to presonal honor. But the original plan of the youth has been carried out, irrespective of these interruptions, without one iota of abridgement or change; and the man stands at 32 where he might have stood at 28, or even (if he had decided to ship his classical college-course, and plunge at once into his technical course) at 24.

"Yet, does he really stand only where he would have stood four or eight years earlier, if no time had been 'lost'? Is it nothing that a man, having been a soldier, knows how to be a comrade—to meet and understand and win to hearty co-operation other men? Is it nothing that, having gained through a classical education the ability to comprehend the lessons of history and the inherited associations which actuate, even unconsciously, the men of to-day, he is able to communicate convincingly to others what he knows himself? Is it nothing that he has shown himself to be a lover of his vocation, yet capable of sacrificing even his vocation to duty and honor? Finally, is his certified professional ability less likely to win professional employment and success, when backed by that other certificate, furnished by a wide experience with men and their enterprises? These, and other like questions are answered by the subsequent career."

The American Institute of Mining Engineers was founded in 1871. At the organization meeting at Wilkes-Barre, Dr. Raymond was elected temporary secretary. He was President in the period 1872-1874. In 1884 he was elected Secretary, a position he occupied till 1911, when he became Secretary Emeritus. During this period he saw the membership grow to over 6,500, at the end of 1917, with a corresponding increase in usefulness and influence.

Many honors were bestowed on Dr. Raymond by universities and technical institutions. Of these it will suffice to mention that he was an Honorary Member of the Iron and Steel Institute of Great Britain, of the Institute of Mining and Metallurgy and of the Societe des Ingenieurs Civils de France. — W. G. M.

DECLINE IN U. S. GOLD AND SILVER OUTPUT.

Washington, January 2.

Gold production in the United States in 1918 fell to 3,313,000 fine ounces, worth $68,493,000, the lowest in twenty years, and silver production dropped to 67,879,000 fine ounces, worth $67,879,000 at the standard Government price of $1 an ounce, the smallest record since 1913, according to the joint preliminary estimate of December of the Mint Baker and the Geological Survey, issued recently.

Return of normal conditions and falling of prices are expected to stimulate gold production in the United States this year, according to views of members of the Treasury's Committee appointed to suggest a remedy for the falling production of last year. Consequently it appears unlikely that the committee will recommend any unusual measures to stimulate production when it makes its report in a week or two.

Rapid mounting of the cost of mining is assigned as the cause of the decline, which is shown by comparison with the 1917 production of $83,750,000 worth of gold and 71,740,000 ounces of silver.

Metal Producers Expect Temporary Lull In Business

Victoria, B.C.

With the announcement, made a few days ago, that British Columbia copper ore shippers to the Tacoma Smelter will have to content themselves with a settlement hereafter on a basis of 11 cents a lb., mining men are speculating as to what is ahead of the industry. Producers here must receive at least 10 cents for blister copper on a 15 cent. market, or discontinue, as there must be allowance for transportation and treatment charges. That the Government price in the United States of 26 cents a lb. is purely nominal and that it is not likely to continue for long in any event, in view of the very large excess supply which the end of the war found on hand, is thoroughly appreciated by those interested. Consequently they are asking themselves what is to be done to right conditions. It is felt that the outlook is not very bright, as far as the immediate future is concerned, at any rate, but there is general confidence that, with the end of peace negotiations and the inauguration of a period of re-construction the demand for copper will become so brisk that the industry of the Province will find itself again with plenty of orders and continued activity assured. By the time this occurs British Columbia will be, or should be, in a position to very materially increase her output, which for 1918 will approximate 60,000,000 lb. The Canada Copper Company will be producing from the Copper Mountain property, and both the Consolidated Mining & Smelting Co., and the Granby Consolidated Mining & Smelting Company will have developed mainland and island properties to the point where they will take places among the large shippers of the copper properties of the Canadian west.

The position with respect to lead is another matter which is giving some concern, inasmuch as the price has fallen, according to information at the time of writing to 6¾ cents a lb. It will be recalled that the Consolidated Mining Company's management at the Trail Smeltery recently issued an order in which it was stated that, owing to the fact that a serious condition had arisen in the Canadian lead market, interest would be charged on money advanced to lead producers. In the course of the announcement reference was made to a large quantity of lead which is in the hands of the Imperial Munitions Board, and is "hanging over the market." This lead is in Canada, and it has been learned that the Imperial Munitions Board has arranged for its exportation, with the idea of relieving the embarrassment which its presence causes to the Canadian market. Mr. F. A. Starkey, of the Associated Boards of Trade of Eastern British Columbia, expresses himself as highly gratified with the latter development, saying: "The sum and substance of the whole thing is that we will now have a clean sheet to start off with. The action of the Board is timely. On December 9th, while in Spokane, I sent a wire to the Board pointing out that the dumping of the lead bought for munitions on the commercial market at this time would mean a glutting of the market. and that would be disastrous to the lead mining districts. But the difficulty is now settled." Mr. Starkey's wire to Sir Thomas White, Acting Premier, read: "During war shippers did not have benefit of Canadian duty, but sold Imperial Munitions Board at practically U. S. prices. Now that the war is over shippers expect that Canada will not be made a dumping ground for Mexican and U. S. surplus and scrap metal." Whether the action taken by the Board with reference to the stock referred to will have the effect which Mr. Starkey looks for is doubted by some who point out that Canada's biggest market is not local, and that the placing of munition lead elsewhere will have the result of reducing the demand for the Canadian production at least for a time, and that, at the best, the prospect is that there are a few dull months to meet.

Zinc at 7¾ cents a lb., with a comparatively inactive market as far as the output of British Columbia is concerned, is not very promising to the industry, but the Consolidated Mining & Smelting Company, it is felt, will be able to keep its refinery in operation by virtue of the bounty provided by the Dominion Government.

The future, however, looks much brighter for gold and silver properties. Gold producing mines are preparing to increase production, and it is confidently expected that in the coming months British Columbia resources in this respect will be largely developed, and those which are past that stage will be exploited to capacity.

The platinum placers of the Tulameen River are likely to receive attention at the hands of private companies, the operations of the Dominion Government in this locality having demonstrated the possibilities. The cessation of the war having affected the demand for molybdenite, chromite and manganese, it is not probable that there will be the active prospecting for these ores that has marked the past year or more. What will be done with the properties of this character located, and to some extent developed, remains to be seen.

The whole situation, to the minds of western operators, appears very complicated. To use their own words "the whole thing at present is mixed up, unsettled and unsatisfactory. We are in for a period of slack times evidently; but it is not likely to last more than for the period of peace negotiations. With an European settlement and the actual commencement of reconstruction there is no doubt that the demand for copper, lead, zinc and other ores will be revived and the industry will jump back as far and beyond the position which it gained during the war. Meanwhile, it is hard to say what is going to happen. We believe, however, that the smelters will be able to continue operations, possibly not on as large a scale, but sufficiently to tide over the hiatus."

RESTRICTIONS ON EXPORT OF BRITISH MANUFACTURES REMOVED.

Important cable dispatches have been received by Mr. G. T. Milne and Mr. F. W. Field, the British Trade Commissioners at Montreal and Toronto, respectively, from the Imperial Department of Overseas Trade in London pointing out that since the armistice was signed many restrictions on commerce have been withdrawn, while in the case of those which remain, licenses are being granted much more freely than previously. Particulars regarding these relaxations will be published weekly in the "Board of Trade Journal," the official organ of the Imperial Government for notices regarding trade.

Orders placed during the war period now have good prospects of being executed, and arrangements for

new business should be made without delay.

The following relaxations in particular should be noted:—

1. Permits to manufacture and Priority Certificates in connection therewith are no longer necessary.
2. Firms are at liberty to accept civil or commercial orders for immediate execution, thus freeing the engineering industry among others, for commercial work.
3. All the principal kinds of raw materials may now be used for the commercial manufacture of goods for export, but these raw materials themselves may not be exported in certain cases without licenses. Among those to which this condition applies are the following: Aluminum, antimony, brass, copper, iron, lead, nickel, spelter or zinc, steel and tin.

In general, restrictions on the export of manufactured goods have been removed, while they have been retained in the case of raw materials.

CONSOLIDATED MINING & SMELTING CO. OF CANADA.

An Active Year, but a Decrease in Profits.

An active and in some respects an expanding business, but one showing less profit than during the previous year, is revealed by the annual statement of the Consolidated Mining & Smelting Co. of Canada, which carries on large operations in British Columbia. The net profit for the year ending September 30 last was $867,259, compared with $1,076,828 in the previous year. This was after providing for $81,986 in taxes, writing off $408,557 for depreciation, and charging profit and loss account with $219,202 in development of properties during the past year. In 1917 $648,058 was written off for depreciation and $380,071 charged for development.

"Taking into consideration the recent improvements in metallurgical processes," says President W. D. Matthews, "and the enhanced value of the company's mining properties on that account, your directors decided to continue payment of dividends at the rate of 10 per cent per annum, charging to profit and loss account the deficit of $180,485. The balance at credit of profit and loss account now stands at $2,148,122." The balance at credit of profit and loss a year ago was $2,360,274. The season's metal product exceeded $10,500,000 compared with $13,000,000 in 1917.

"The continuous increase of the scale upon which the company has been operating for the purpose of meeting the copper, zinc and lead requirements of the Imperial Munitions Board," says Mr. Matthews, "and the development of new processes, especially those involved in the electrolytic treatment of complex zinc ores, have involved the expenditure of a large amount of money for new plant, but your directors hope that the result will be that the company will thereby be able to produce metals profitably at prices which may be expected to prevail under peace conditions. The cost of the new construction which was found necessary from time to time greatly exceeded the estimates by reason of the excessive and continually increasing costs of labor, materials and supplies of all kinds. Your directors, owing to these increased expenditures and to the interruption of operations during the first part of the year, have not been able to reduce the bank overdrafts as had been hoped and expected."

An issue of $3,000,000 in 7 per cent debenture bonds is planned. The power development of the West Kootenay Power & Light Co. will be extended and the copper refinery capacity increased from 20 tons to at least 50 tons per day. These capital expenditures will amount to at least $1,500,000. The company's assets are now placed at $17,099,923, compared with $16,994,568 last year.

Reports of company officials speak of the high cost of materials, delicate labor situation, and decision of the Imperial Munitions Board to pay but little if any more for lead requirements than these could be secured for from foreigners, though costs are higher in Canada. "At the same time," says Mr. James J. Warren, the Managing Director, "it must be realized that war activities have resulted in the establishment on a firm footing in Canada of industries engaged in the production of high-grade zinc and refined copper. The fabrication of these metals is bound to follow in due course."

FOUR ROPE HOISTING SYSTEM FOR NANAIMO COLLIERIES.

Experiments have been at progress at the collieries of the Canadian Western Fuel Company, Nanaimo, B. C., for the last two months in the effort to arrive at a solution of the problem of rendering impossible, or reduring the possibility to a minimum, a repetition of such an accident as that of last September when the rope used in Protection Island Shaft broke, causing considerable loss of life.

The ingenuity of Mr. Thomas Price, master mechanic for the company, has resulted in an arrangement which seems to come very close to meeting requirements. He has devised, and demonstrated its practicability in actual operation, a working model of a four rope hoisting system.

Mr. George Wilkinson, Chief Inspector of Mines, describes the arrangement as follows:

"There are four complete hoisting ropes, an overwind rope and an underwind rope on each compartment of the drum. Four pulley wheels are used, two of them being set some distance above the other two to avoid fouling of the ropes.

"The ropes on the two upper pulleys cross. A drum of the usual dimensions is used. Having an overwind and underwind rope on each compartment, the one rope is being unwound while the other is being wound.

"As the under rope is being wound on the drum and hoisting the cage, an overwound rope is being unwound and descending with the cage in the opposite compartment. The operation is the same on the other side of the drum. The whole operation is made feasible by simply crossing the two ropes that lead to the two upper pulleys."

Mr. Wilkinson asserts that this is one of the simplest and most practical arrangements he has seen on using safety ropes. He points out that everything is under control of the engineer, the same hoisting speeds being used on all ropes. Any possibility of slipping is avoided because all ropes are fastened to the drum.

Preparations are being made by the Western Fuel Company for the installation of this double rope system at their new mine, the Wakesiah, near Nanaimo, B. C.

The Canadian Honorary Advisory Council for Scientific and Industrial Research*

By DR. A. B. MACALLUM.

"Reconstruction and Development" in Canada in the new era of international girding for supremacy in the arts of peace means to the Canadian Honorary Advisory Council for Scientific and Industrial Research much in so far as "development" is concerned, but little in regard to "re-construction." Re-construction postulates the building up again of what existed before; and up to the outbreak of War there was constructed in Canada no national organization for research work. The glowing path of Canada's opportunity for industrial development runs wide and far, but the Council's research path has to be blazed through a comparatively unexplored forest. It is almost entirely new ground to be covered.

Where Germany and, though perhaps in lesser degree, the United States had builded before the war great organizations for industrial research founded on wide-visioned realization of the commercial value and necessity of applying science to industry, in Canada, as in Great Britain, state encouragement and individual enterprise had, until the war started, been content in the main with a laisser-faire policy. Germany had her trained technologists and research workers by the thousands in every field of industry, and, through the organized application of science to industry, was winning her trade victories in every foreign mart.

In the United States, which early took a leaf from Germany's book, the great Universities like Harvard, Yale, Chicago, Columbia and Cornell had staffs and equipments in pure and applied science, which kept pace or almost kept pace with the demand from great American industrial establishments for trained scientific investigators, chemists, electrical engineers, metallurgsts, etc. to solve industrial research problems. The annual budget of the Massachusetts' Institute of Technology, for instance, exceeded before the War, and still exceeds, the total of the annual expenditures of all the Faculties of Applied Science in Canada. There are some two thousand research laboratories in connection with large industrial concerns in the United States, and each of more than fifty individual firms expend annually sums ranging from $25,000 to $500,000 for research.

In Canada in a score of years less than twenty students have received the advanced (Ph.D.) degree in science from the University of Toronto and fewer still from McGill. Not two per cent. of Canadian firms have research laboratories and only about ten per cent. have routine laboratories, chiefly for the testing of materials. If Canadian industries were to seek for a supply of trained technical men capable of applying the most advanced scientific knowledge to industrial processes sufficient to meet even their most ordinary needs, the number of adequately trained men available would not be sufficient to satisfy five per cent. of the demand.

That, briefly put, is the situation with regard to the needs in Canada for equipment and men for research work. That is the situation that has confronted the Research Council since its creation in December, 1916. And that has been, and is, the crux of all problems of scientific and industrial research in Canada, handicapping the carrying out of the large research programme planned for the past year and for the coming year, jeopardizing Canada's position in the international rivalry for export trade and demanding prompt remedy if the full measure of our opportunity is to be grasped. In resources of capital and materials, in all the natural advantages for industrial supremacy we are in an enviable position as compared with our trade competitors. But in regard to the vital question of scientific organization of our industrial processes of finding new uses, hence new markets for the raw materials and the by-products of manufacture, and of keeping pace with the advances made in other countries through research, we have as yet hardly touched the fringe of opportunity.

Confronted with this situation and with a slowly awakening public and individual realization of its portent, the main task of the Council this past year has been, while carrying on the immediate needs of research work with the means at hand, to pave the way for meeting adequately the urgent needs of the future. The goal has been a supply of trained men for research work, adequate equipment and facilities for research and the enlistment of industrial organizations in co-operative effort to solve common problems, the solution of which lies in the application of science to industry.

A Central Research Institute.

The great forward step taken has been to promote the establishment of a Central Research Institute at Ottawa, combining the functions of the Bureau of Standards at Washington and of the Mellon Institute at Pittsburgh.

The proposal for such an Institute, submitted to the Government in November last, was the result of many months' careful investigation by the Council.

In view of the situation above outlined, the argument advanced in support of it is so obvious as to need no re-statement here. There has been a prompt and appreciative response to the proposal by the Government and by all the public interests concerned. There is good reason to believe that the Institute will be established without any unnecessary delay. It will involve an expenditure of $500,000 for a four-storey building, having initial provision for fifty laboratory rooms and with plans so drawn as to provide for expansion as the needs develop. The cost of the scientific equipment is estimated at $100,000, and the cost of maintenance, salaries, etc. at about $100,000 per annum for the first few years.

Trade Guilds.

The establishment of the Institute is the necessary first step towards placing industrial research work in Canada upon an adequate and permanent basis and towards enabling the Dominion to keep abreast of similar progressive methods in the United States, Great Britain, Japan, France, Australia and our other trade competitors. It will, doubtless, be followed by the or-

*Written for the Toronto Globe's annual financial survey issued on Jan. 2, 1919.

ganization of trade guilds or associations for research in each branch of industry, formed to pool resources in solving common problems and to take advantage of the laboratory equipment and opportunity offered, under the Council's proposals, by the Government-maintained Institute.

Training of Scientific Workers.

A further necessary step will be the working out of the Council's plans for more adequate provision by the Universities for the training of qualified scientific workers. In the more generous investment of state funds for this purpose, starting, say, with Toronto, McGill, and L'Ecole Polytechnique, lies the hope of securing for the ensuing years of the world's strenuous and pitiless trade warfare the nation's leaders in scientific and industrial research.

Research Problems Undertaken by Council.

Apart from these crucial phases of the work and aims of the Research Council, space permits only passing reference to some of the many research problems already undertaken.

$400,000 for demonstration plant.

As a result of the Council's initiative, Governmental action was taken in June last to secure federal cooperation with the governments of Saskatchewan and Manitoba in establishing a demonstration plant in the Souris coal areas of Southern Saskatchewan, to prove the commercial feasibility of carbonizing and briquetting the Western lignites for heating, in domestic furnaces. This year will see a plant established with an outlay of $400,000 and an annual output of 30,000 tons of coal equal to the Pennsylvania anthracite and marketed in Regina or Moosejaw at, at least, two dollars per ton less than the imported anthracite is now costing. The success of the initial plant, about which there can be little doubt, will lead eventually to the development of the immense and little realized latent lignite resources of Saskatchewan and Alberta, relieve for for Ontario and Quebec the present coal famine through limited American supply and save to Canada the five or six millions of dollars now annually going to the United States for coal for the prairie provinces.

Study of growth of trees.

A systematic study of the rate of reproduction and growth of Canadian forest trees of the commercial species has been undertaken through scientific survey of some eighty square miles of an old cut-over lumber district on the Petawawa Military Reserve. The data being secured will in the course of a few years give, for the first time, the essential definite information enabling the Dominion and Provincial Governments to inaugurate on a scientific and practical basis a scheme of re-forestation paralleling the best results obtained in the past in Europe. Our forest wealth, now in danger of exhaustion through reckless waste and disregard of adequate conservative systems, can only thus be preserved as a great and permanent national resource.

Tar fog research.

The tar fog research, initiated in 1917, has been continued with satisfactory practical results which will doubtless lead in the near future to the application to various plants in Canada of a new electrical process for the recovery of valuable by-products now lost in the destructive distillation of coal, wood, etc.

The research on sound measurements and fog signalling conducted in 1917 by Dr. Louis King of McGill has made further progress this year and forecasts a new type of sirens for use on the St. Lawrence River and Gulf.

Research work connected with the recovery of industrial alcohol from the enormous sulphite liquor waste of our Canadian pulp mills points to the installation of recovery plants and the production in Canada, at decreased costs to consumers, of the alcohol increasingly needed for industrial purposes and as a substitute for motor fuel.

There has been a score or more of other phases of industrial research initiated or continued during the year, each having a practical bearing on some branch of national production. More should and could be done, were trained men and money available. The Council's budget for the year has been under $100,000. In Great Britain, Parliament has recognized the need and the opportunity by creating a separate Department of Scientific and Industrial Research and has voted one million dollars per annum for five years to be expended by the Research Council. In Canada we, too, are learning the obvious lesson taught by Germany and already adopted by British industry. The path has been blazed for replacing rule of thumb methods in Canada by scientific investigation.

Special Correspondence

BRITISH COLUMBIA.

Will Install Plant at Meteor Mine.

The Meteor mine near Slocan City, B.C., has been bonded by Messrs. J. C. and W. A. Buchanan, the consideration given being about $45,000. It is a silver mine, but the ore carries also gold values. Twenty-two tons of the high grade ore was shipped to the Trail Smeltery recently. It is the intention to install a compressor in order to facilitate the carrying on of development work on a large scale. Mr. W. A. Buchanan will manage the mine

Aerial Tramway for Mountain Chief Mine.

Another gold-silver property of British Columbia to change hands recently is the Mountain Chief at Renata, which was bonded by J. W. Evans, of Revelstoke, B.C., the figure involved being understood to be $100,000. Mr. Evans plans to carry on operations in a more extensive manner than the previous owners, one of the first pieces of work to be undertaken being an aerial tramway from the mine to Arrow Lake. With this facility for transportation he figures on materially increasing the present output of 200 tons a month.

Cassiar Crown Strikes Good Ore.

The strike of a considerable body of copper ore of good grade is reported from the north of British Columbia, Hazelton District. The property on which this promising development has taken place is owned by the Cassiar Crown Copper Company. Although work has been maintained for several years past, nothing of special note was discovered, though there was sufficient ore of good quality shown to encourage the owners. Early in the past summer the company awarded a contract to run a short tunnel on the Ruby Claim, one of the group. A short time before the contract was completed the crew began breaking into ore, which widened with every round until, with the completion of the tunnel contract, they had exposed a vein fourteen feet in width with ten feet of clean ore.

Constructing Tipple at Diamond Vale Mine.

At the Diamond Vale Mine, Merritt, B.C., a tipple is being constructed in order to permit an early resumption of operations. The mine has been idle for some time.

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Powdered Fuel More Economical Than Oil?

It is reported that the use of powdered fuel by the B. C. Sugar Refinery, Vancouver, B.C., has proved satisfactory and that, as a result, the Powell River Pulp and Paper Company, and the Ocean Falls Plant of the Pacific Mills, Limited, are likely to adopt the same system. It is said that powdered fuel has been shown to be more economical than oil in this Province, and if the development suggested takes place, there will be established an important additional market for the output of the coal mines of Vancouver Island, Merritt and Princeton.

Delayed Settlements Cause Closing Down of Mine.

Supt. W. G. Norrie-Loewenthal, of the Silver-Standard Mine, in announcing the temporary closing down of his mine, says:

"Our reason for closing down the mine and the mill at this time is purely one of freight rates and the value of Silver Standard ore and concentrates. The railways, chiefly on the American side, where the zinc is shipped, have been altering their rates to such an extent that the smelter people are unable to make a settlement until the rates are adjusted. The matter has been up for two or three months, the Silver Standard people hoping all the time that the rates would be satisfactorily adjusted, and operations continued at the mine. As yet nothing has been accomplished, and it may take another two or three months.

"The position of the Silver Standard is very simple. They have not yet received a dollar for all the zinc concentrates sent to the smelter on the other side, and no chance of getting any until the rates are adjusted, either for what has been shipped or for what is on hand. To continue operations under the circumstances is out of the question.

"As for the mine itself it never was in better shape. There are several shoots of very fine high grade ore recently opened up. Work at both the mine and the mill has been running very satisfactorily. There are on hand a hundred tons of zinc concentrates and 72 tons of lead concentrates."

Mr. R. H. Stewart Will Adjust Taxes.

R. H. Stewart, M.E., of Vancouver, has been appointed by the Provincial Government for the purpose of adjusting the income tax to which the mining companies operating in British Columbia are subjected. He will review the companies' balance sheets from a technical point of view and it is expected that, with his mature experience of operating, he will be able to arrive at equitable settlements in every instance.

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Mines Shipping Ore to Trail.

The two mines shipping the largest quantities of ore to the Consolidated Mining & Smelting Co's plant at Trail, B. C., during the past year up to the end of November were the War Eagle-Centre Star-Le Roi group at Rossland and the Sullivan mine, owned by the company. The former's total was 88,934 tons, the values being mainly in gold, and the latter's 88,836 tons, of which 82,742 tons supplied the zinc plant of the smelter. Other large shippers were the Emma Mine at Eholt, also owned by the company; the Josie Mine at Rossland with 17,114 tons, No. 1 Mine at Ainsworth, the largest shipper of silver-lead ore outside of the Sullivan with 5,782 tons, the Standard Silver Lead Mining Company at Silverton with 5,658 tons and the Bluebell at Ainsworth with 5,319 tons. There were some shippers from outside the Province among them being the Mandy Mine of Manitoba, which shipped 5,711 tons of high grade copper ore, the Electric Point in Washington which sent 4,563 tons of silver-lead ore, the San Poil at Republic which sent 2,615 tons of siliceous gold ore and the United Copper at Chewelah, which shipped 2,615 tons. Ore receipts at Trail from the various districts of British Columbia are as follows: Rossland, 107,457 tons; East Kootenay, 93,563 tons; Slocan and Ainsworth, 29,303 tons; Boundaty, 19,787 tons; Nelson, 4,246 tons; and American mines, 12,962 tons.

Conditions in Rossland.

Conditions are materially improving in Rossland, one of the most important of the mining centres of British Columbia. This is due to the resumption of operations on a large scale of the mines of the Consolidated Mining & Smelting Company. These are the largest gold producers of the province, their output under normal conditions being three-fifths of the gold produced by British Columbia.

EDITORIAL

$220,000,000 IN 1918.

The total value of the mineral production in Canada during 1918 was probably not less than $220,000,000. The total value of the production in 1917 was $189,646,821.

The Department of Mines estimates the production of coal during 1918 at about 15,180,000 short tons, as compared with a production of 14,046,759 short tons during 1917.

The production of the more important metals during 1918 is estimated as follows, viz.: Gold, $14,750,000 in value; silver, 20,800,000 ounces; copper, 117,000,000 pounds; nickel, 91,500,000 pounds; zinc, 36,000,000 pounds; pig iron, 1,182,000 short tons; steel ingots and costings, 1,010,000 short tons.

The production of these metals in 1917 was: Gold, $15,272,992 in value; silver 22,221,276 ounces; copper, 109,227,332 pounds; nickel, 82,330,280 pounds; zinc, 29,568,764 pounds; lead, 32,576,281 pounds; pig iron, 1,170,480 short tons; steel ingots and castings, 1,745,734 short tons.

NICKEL-COPPER MINING IN CANADA.
About 45,000 Tons Nickel and 13,000 Tons Copper, Valued in Matte at $36,000,000, from Sudbury District in 1918.

The year 1918 is one of unusual interest in the nickel-copper industry of Canada. The large production of nickel-copper matte was of itself a notable accomplishment, when the shortage of labor is considered. More remarkable than this, however, was the big advance towards making Canada the world's chief source of refined nickel, as well as of matte. The Port Colborne, Ontario, refinery began operations in July, 1918, and is now producing large quantities of nickel. Another refinery is in course of construction at Descrenes, Quebec.

During the first nine months of the year 1918, the smelters at Copper Cliff and Coniston treated 1,141,089 tons of ore, producing therefrom 64,926 tons of nickel-copper matte valued at $26,925,872 containing 33,688 tons of nickel and 17,232 tons of copper. Production for the year will be about 45,000 tons nickel and 13,000 tons copper. The value of the matte produced during the year will be about $36,000,000. As a considerable amount of this matte is now being treated at the refinery of the International Nickel Co. of Canada at Port Colborne, and added value will be given that will swell this total. During 1919 a much larger portion of the matte will be refined in Canada.

The new refinery, started in July, had produced at the end of September 358,205 lb. of nickel and 359,713 lb. of copper. This is much more nickel than had previously been produced, and is the first large production of refined copper. Until July, 1918, the refined nickel produced in Ontario was a by-product from the treatment of Cobalt silver ores, which contain silver, cobalt, nickel and arsenic. All the nickel-matte from the Sudbury district formerly went abroad, most of it to the United States and the remainder to Wales. It is hoped that from now on an ever-increasing proportion of the matte will be refined in Canada.

During the war we were handicapped by the lack of refining facilities. Fortunately it was found possible to prevent nickel from going to our enemies during the war; but we were not in a very strong position, owing to the necessity of exporting our matte in order to have it refined. We will not likely ever be in that position again.

At the mines and smelters the shortage of men has naturally necessitated that attention be specially given to maintaining output at as near capacity as possible. Nevertheless, improvements have been made during the war that will make more efficient operations in the years ahead. The Sudbury nickel-copper industry continues to grow and the operating companies can look forward to a long and prosperous life. Nickel and copper have, of course, been recently chiefly in demand for war purposes; but nickel and copper have a variety of uses that insure a big demand in peace times also. The cessation of war orders will necessitate more attention being given to markets; but we have no doubt that markets will be found.

ARE WE MAKING THE MOST OF OUR OPPORTUNITY?

Next to agriculture, mining is Canada's greatest basic industry. It is from the mines that we obtain our fuels, much of the material used in manufactures, and for building materials. Next to food, the mine products were the most necessary things used by our valiant soldiers in winning the war. Like food, mine products will be very necessary during the period of reconstruction. The Canadians who interest themselves in mining have good reason to believe that our mining industry will expand enormously if carefully handled during the coming years. They believe that rapid development of our mineral resources will help to make the Dominion prosperous. They know that Canada has natural resources

which place her in a very advantageous position now. They appreciate also that the mere having of these resources will not avail us much unless we proceed with development more rapidly than ever. Ore in the ground on undeveloped property is of comparatively little value. The benefits it can give come only with the expenditure of capital and labor. The sooner we can find the necessary money and men to develop our mineral resources the greater will be their value as a source of wealth to the country.

The Right Honourable Lloyd George, in proposing peace terms before the Trades and Labour Council of Great Britain, said: "Economical conditions at the end of the war will be in the highest degree difficult, owing to the diversion of human effort to warlike pursuits. There must follow a shortage of raw materials, which will increase the longer the war lasts, and it is inevitable that those countries which have control of raw materials will desire to help themselves and their friends first. Apart from this, whatever settlement is made, will be suitable only to the circumstances under which it is made, and as those circumstances change, changes in the settlement will be called for."

Alfred Ballin, organizer and administrator of the German shipping trust in a recent letter to Dr. Ratheman, of Berlin, remarked as follows: "You do not believe in the silly assertion that after the war these British markets for raw materials will be open to us? What a prospect! Out of the British Empire are produced countless articles on which we have hitherto relied and which will be indispensable in the future if we are to swim and not to sink."

We have the raw materials. We have the opinion of well informed men that the possession of these raw materials puts us in a peculiarly fortunate position. To derive the advantage which this position gives us it is essential that we proceed at once to use these materials. We do not conserve by neglect to use. We do not help to pay the interest on Government bonds when we leave potentially valuable ores in the ground. We should speed up development. We should recover more gold from the ground and put that gold to work; it yields no interest in the form of undeveloped ore.

Much progress has been made in developing our mineral resources in recent years. The value of our production of minerals for the year 1918 was about twenty times that of the year 1886. The value per capita last year was about ten times that of 1886. Nearly every year since 1886 there has been both an increase in value and per capita. Our production at the present is at the rate of about $200,000,000 annually. Much of this product of the mines is manufactured in Canada into a countless variety of useful things, thereby increasing in value by many millions of dollars.

We should, however, not be content with this record. We should awaken to the fact that we are proceeding too slowly. There is much good work being done by operators and by Government departments; but we need more workers and more encouragement for them.

A FAIR DAYS WORK FOR A FAIR DAYS PAY

Steps have been taken by the management of the Consolidated Mining & Smelting Co. to secure the cooperation of its officials and men at Trail, B.C., in meeting and tiding over the period of slackness which it is foreseen must be expected if the present unsatisfactory condition of the metal market continues. Two employees from each of the nine departments of the smelting and refining works were called into conference recently by the assistant manager, Mr. S. G. Blaylock. At this conference the future was frankly discussed, and it was pointed out by the management that it would be necessary for all identified with the industry to work together in the determination to maintain the highest degree of efficiency if the conditions likely to be encountered in the immediate future were to be satisfactorily overcome. Mr. Blaylock explained to the men that the company wished to continue in operation as long as the metal situation would permit. Parts of the plant might at times be temporarily idle but, with the maintenance of efficiency, other work would be found for the men, possibly along the line of construction. All he asked for was a fair day's work for a fair day's pay, and he would leave it to the conscience of each one to decide whether such was being rendered. Questions were asked by the men's representatives relative to the prospects, and answered as fully as the information available permitted. The discussion concluded with a complete understanding between management and the men, and it is confidently believed that the two will work together amicably and enthusiastically to the end that the difficulties expected may be tided over without recourse to any drastic measures.

PORT ARTHUR WANTS IRON AND STEEL WORKS.

The granting by the Dominion Government of 50 cents a ton bounty on all iron mined and smelted in Canada and the establishment, by authority and with the support of the Federal Administration, of a large blast furnace and steel plant at or near the city of Port Arthur, Lake Superior, are two important petitions to be laid before Premier Borden and his colleagues at an early date by the people of the district of Port Arthur.

Arguments for the granting of a bounty are enumerated as follows:

That during the last decade over 90 per cent of the product of the Canadian furnaces was from im-

ported ore, of which 58 per cent came from the United States Lake Superior mines and 41.9 per cent from the Newfoundland mines.

That the proportion of domestion iron ore smelted in Canada has gradually declined until in 1917 it was only 4.23 per cent.

That the iron ores of Canada are sufficiently known to warrant the statement that there is a large tonnage that could be made available for use by some preliminary treatment, if the increased cost of such treatment were compensated for by a bounty, as the ores of the Atikokam Range require roasting, Loon Lake ores hand sorting, Magpie siderite ores calcining, and Moose Mountain and Bathurst ores concentrating.

That extensive areas of promising iron formations have been located in many parts of Canada and it is reasonable to expect that the concentrations of merchantable ore will be found in these ranges when systematically exploited, especially on the Steep Rock, Mattewan, Kaministiquia, Nipigon, Little Long Lake and Michipicoten district.

That the granting of a bounty on iron ore would stimulate the prospecting of these areas, and probably secure the active operation of several mines already developed and equipped at a heavy expenditure in Northern Ontario and provide remunerative freight traffic to several sections of the Canadian Government railways that are at present apparently unproductive.

That the increased employment of mine operators, explorers and transportation employees, together with the general development of the iron mining districts, would so materially increase the customs receipts of Canada that the proposed bounty would be a very small tax (if any) on the finances of the Dominion.

Some of the points made in support of the plea for a Dominion Blast Furnace and Steel Plant are:

That practically all the steel plants in the Dominion are in Eastern Canada and have received $16,000,000 in bounties.

That between 1905 and 1915 Canada imported iron and steel products to the value of about $632,000,000.

That the population of Western Canada is now over 2,000,000 and in ten years has increased 174 per cent, whereas that of Eastern Canada has increased only 17 per cent.

That there are about 19,000 miles of railway in Western Canada radiating westward from the City of Port Arthur and manufacturing plants representing over $308,000,000.

That the United States Steel Company some years ago erected a large steel plant at Duluth at a cost of over $25,000,000 to supply the requirements of the Western States and is about to proceed with the erection of additional mills at a cost of approximately $15,000,000.

The policy recommended to the Dominion Government in the launching of the proposed industry is that the cost be placed at about $15,000,000 and that the interest for thirty years on eighty per cent of the actual capital invested be guaranteed or that the same guarantees be allowed as have been given to Canadian dry docks and shipbuilding plants to the extent of about $13,000,000.

VANCOUVER BOARD OF TRADE ASKS FOR ORE TESTING PLANT.

A petition that an ore testing plant be established in British Columbia, and that the drilling of the placer ground of the Tulameen River be continued will be presented to the Dominion Government by the mining Bureau of the Vancouver Board of Trade. The same organization proposes asking the Provincial Government for an explanation of its failure to diamond drill iron properties of the Province in order to arrive at an estimate of the available tonnage of magnetite and hematite ores.

With respect to the ore testing plant it is asserted that British Columbia operators are handicapped because they have to send sample shipments to Ottawa for treatment, a procedure which is both costly and slow. The type of plant required would cost only about $75,000, it is stated, and such an expenditure would be amply repaid in benefit to the mining men and the industry.

As to the Tulameen platinum operations it will be pointed out that during the past three months fourteen holes have been drilled and that the showings obtained fully warrant further prospecting. To discontinue the work now, it is argued, would be wasteful and unjustified. It has been demonstrated that this valuable mineral exists in the placer ground and the commercial possibilities of the resource should be determined before the work is abandoned.

It also was felt that no further time should be lost by the Provincial Government in taking action towards obtaining exact and authoritative information on the iron ore deposits of the Province.

P. B. Freeland, Resident Mining Engineer for the British Columbia Government, with headquarters at Grand Forks, B.C., who formerly was with the Granby Consolidated Mining & Smelting Co., was married recently at Vancouver, his bride being Miss Mary Bagley, of that city.

Mining Convention in Vancouver in March.

An International Mining Convention will be held in Vancouver (B.C.), sometime during the month of March, 1919. It had been proposed that this gathering should be called for January, but a postponement to the latter date has been agreed upon by the members of the Vancouver Chamber of Mines. The Convention has the endorsation of Hon. Wm. Sloan, Minister of Mines, and the Resident Mining Engineers of the various mining districts of the Province are expected to take an active part. The proceedings are likely to be of special importance, because of the problems which will come up for consideration.

Imperial Mineral Resources Bureau, London, Eng.

When the war came on the British Empire found that the enemy had more or less complete control of certain mineral industries of vital importance. Germany had been importing minerals and ores from various parts of the British Empire, refining them, and, in some cases, selling a part of the refined materials to the British. Early in the war it was found that while certain minerals and ores could be produced in quantity, facilities for refining them were either entirely lacking or were inadequate. It was decided that this state of things should not be allowed to continue, and great advances in metallurgy and the mineral industry generally, have been made in Britain during the war. The Scientific Products Exhibition held in King's College, Strand, August 12th to September 7th, 1918, and that of the Key Industries in Central Hall, Westminster, some weeks later, were illuminating as to the independence Britain now occupies.

Imperial Mineral Resources Bureau.

On the subject of the Empire's Mineral Resources, the Imperial War Conference, at its sittings in June and July, 1918, dealt with the following Memorandum prepared by the Minister of Reconstruction:—

1. In accordance with Resolution No. XIII of the Imperial War Conference, 1917, and following the report of a Special Committee presided over by Sir James Stevenson, steps have now been taken to establish the Imperial Mineral Resources Bureau.

2. In accordance with the recommendations for the constitution of the Governing Body contained in Sir James Stevenson's Report, the following representatives have been nominated on behalf of the Governments concerned:—

Chairman of the Governing Body (and Representative of the United Kingdom): Sir Richard Redmayne, K.C.B..
Canada: Dr. Willet G. Miller.
Commonwealth of Australia: Mr. W. S. Robinson.
New Zealand: Mr. Thomas Hutchinson Hamer.
Union of South Africa: The Right Hon. W. P. Schreiner, C.M.G.
Newfoundland: The Right Hon. Lord Morris, K.C.M.G.
India: Mr. R. D. Oldham, F.R.S.
Colonies and Protectorates: Mr. J. W. Evans, D.Sc., LL.B.

3. As regards the proposed representatives of mineral, mining, and metal industries, owing to the magnitude and complexity of the interests involved and the obvious desirability of having at the disposal of the Governing Body the best expert knowledge available, it is desired to increase the number of these representatives to six instead of the four originally recommended in Sir J. Stevenson's Report, to which the Dominion Governments have agreed. If this is accepted by the participating Governments it is proposed to nominate the following:—

Westgarth Forster Brown, Esq. (A leading consulting mining engineer, especially in regard to coal and coal mining; Mineral Adviser to His Majesty's Woods and Forests; Deputy Gaveller of the Forest of Dean, with experience in many Colonies.)

Professor H. C. H. Carpenter. (President of the Institute of Metals; Professor of Metallurgy in the Royal School of Mines.)

Dr. F. H. Hatch. (Ex-President of the Institution of Mining and Metallurgy; now advising the Ministry of Munitions on iron ore supplies. Has world-wide experience in metalliferous mining, and is a member of the Mineral Resources Advisory Committee of the Imperial Institute.)

Sir Lionel Phillips, Bart. (The well-known authority on South African mining; formerly President of the Chamber of Mines, now Comptroller of the Mineral Resources Development Department, Ministry of Munitions.)

Edgar Taylor, Esq. (Of Messrs. John Taylor and Sons; retiring President of the Institute of Mining and Metallurgy; an authority on gold mining.)

Wallace Thorneycroft, Esq. (President of the Institution of Mining Engineers; an authority on questions of iron mining and working.)

4. It is desirable to submit to the present Imperial War Conference proposals as to the position of the Bureau and its status in the machinery of Government.

The duties of the Bureau are thus defined in Resolution XIII, passed by the Imperial War Conference on the 23rd April, 1917:—

> "The Bureau should be charged with the duties of collection of information from the appropriate departments of the Governments concerned, and other sources, regarding the mineral resources and the metal requirements of the Empire, and of advising from time to time what action, if any, may appear desirable to enable such resources to be developed and made available to meet the metal requirements of the Empire."

This definition is expanded, as follows, by Sir James Stevenson's Committee:—

> "(a) To collect, co-ordinate, and disseminate information as to resources, production, treatment, consumption, and requirements of every mineral and metal of economic value.
>
> "(b) To ascertain the scope of the existing agencies, with a view ultimately to avoid any necessary overlapping that may prevail.
>
> "(c) To devise means whereby the existing agencies can, if necessary, be assisted and improved in the accomplishment of their respective tasks.
>
> "(d) To supplement those agencies, if necessary, in order to obtain any information not now collected which may be required for the purposes of the Bureau.
>
> "(e) To advise on the development of the mineral resources of the Empire or of particular parts thereof, in order that such resources may be made available for the purposes of Imperial defence or industry."

5. The constitution, as suggested by Sir James Stevenson's Committee, is as follows:

> "The administration of the Bureau should be controlled by a Governing Body representing the various parts of the Empire, as well as the mineral, mining, and metal industries. This body should be responsible for the appointment of a Director, or such other official or officials as may

be considered desirable, and the necessary subordinate staff, within the limits of the funds available for administrative expenses."

The Committee further suggested that the expenses of maintenance of the Bureau (being a sum not exceeding, for the first year of existence, £10,000 per annum) should, for the time being, be voted by the Imperial Parliament, on the advice of the Minister of Reconstruction, although the view was held by some of the Committee that from the outset direct contributions to the maintenance of the Bureau should be borne by all the Governments concerned.

6. It is proposed that the Bureau should be granted Incorporation by Royal Charter, which should define the constitution and the duties of the Bureau. The Governing Body will be established on the lines laid down by Sir J. Stevenson's Committee, with such alterations as may be approved by the Imperial War Conference.

7. As to expenditure, each Government would, of course, pay the expenses of its own representative. The normal expenditure of the Bureau would be met out of funds contributed by the Imperial Government, as suggested in the Report of Sir James Stevenson's Committee, together with such contributions from the Oversea Governments as they may, by agreement, be prepared to make.

This arrangement shall continue for three years, before the end of which time the question as to the contribution to be made by the Oversea Governments shall be brought up for discussion at an Imperial Conference.

8. Power should be given in the Charter to hold and deal with moneys which would be placed at the disposal of the Bureau by way of grants in aid contributed by the Imperial and Oversea Governments. Annual reports on the work of the Bureau shall be made to each of the Governments concerned.

Resolution XVI.

The resolution made was in the following terms:—

The Imperial War Conference, having considered the memorandum by the Minister of Reconstruction on the Imperial Mineral Resources Bureau, as amended, agrees that the number of representatives of the mineral, mining, and metal industries on the Governing Body of the Bureau should be increased from four (as originally agreed) to six. The Conference further approves the proposal for a Charter of Incorporation as set out in paragraph 6 of the memorandum and the proposals in paragraphs 7 and 8 as to the allocation of expenditure.

In accordance with the recommendation of the Conference the organization of the Bureau has been proceeded with and a charter applied for. Meetings of the Board of Governors, whose names are given above, have been held periodically, and committees on organization, finance, etc., have been at work. Thus far the meetings have been held in the Ministry of Reconstruction, but it is hoped that the Bureau will soon have a home of its own, probably in the vicinity of the Strand or Kingsway. It is already evident that there is much important work waiting to be undertaken by the Bureau which can be of great service to the Empire.

Mr. A. L. Larsen, until recently draftsman for the Consolidated Mining & Smelting Co., at Trail, B. C., is leaving for San Francisco, where he has been appointed to a position with a metallurgical concern.

COAL MINERS DID THEIR SHARE OF WAR WORK.

In discussing the contributions made by the different coal mining centres of British Columbia towards winning the war the labor paper of British Columbia, in a recent issue, gives figures and mentions many individual instances which indicate that the records of all these communities has been all that could be desired.

Introducing the article in question the editor says: "At the commencement of the war it will be remembered that the conditions in the mining industry, in common with many others, were somewhat parlous. Hundreds of long resident miners had already departed for other fields and many to other countries. In addition to these facts the call from Britain for industrial workers was readily responded to, and the commissioners enrolled men freely from the mining camps for this purpose. Many aliens have been introduced into British Columbia, and, particularly on the Island (Vancouver Island), the Asiatic miners have replaced the white by hundreds. Therefore any comparisons of number of enlistments to miners employed would be completely misleading unless these facts are also considered in connection with the very incomplete returns from the whole of the province."

Officials of District 18, U.M.W. of A., which includes Eastern British Columbia and Alberta coal fields, are mentioned as follows:

John Larson, of Lethbridge, a member of the district executive board when he enlisted, who was killed in action.

Jack Price, an active member of the local union of the district, and a candidate at one time for the office of President, who went to the front and made the supreme sacrifice for his country.

Clement Stubbs, a former president of District 18, who was granted a commission and served as a lieutenant. He was twice wounded, but has come through some of the most severe actions with his life. He is a brilliant orator, and his return is looked forward to by fellow workmen, it being anticipated that he will resume a leading place in the counsels and the activities of the labor movement of western Canada.

Then there was W. L. Phillips, another ex-president of District 18, who was killed while on service.

After mentioning specially many of the residents of the City of Fernie, who gave their lives, and printing a long list of the members of Gladstone Local Union No. 2314 who enlisted, some of whose names are numbered among casualties who never will be seen again and others of whom are expected back shortly, Tom Blairmore and "Old" Bill Archer are referred to. They went away with a Tunnelling Corps. Both were well-known and popular, besides being prominent in labor circles. "Bill" returned with rheumatism, only to be killed in one of the Blairmore Mines two days after he went back to work.

The coal miners of Michel, B.C., are credited with having sent one-third of their numbers to the war, the total being 98 men, while from South Wellington, Vancouver Island, there went over forty of the union members. No roll was kept of the number of enlistments from the Cumberland District, Canadian Collieries, Ltd., but it is estimated that at least 300 went overseas. The Nanaimo Mines contributed proportionately.

OPPORTUNITIES FOR PROSPECTORS IN THE COUNTRY TRAVERSED BY THE PACIFIC GREAT EASTERN RY.

In a report just issued by the Geological Survey Branch of the Department of Mines, Ottawa, Mr. Charles Camsell, director of the British Columbia Station, gives an interesting and instructive account of a reconnaisance of the country in British Columbia, through which the Pacific Great Eastern Ry. passes.

After pointing out that the principal mineral deposits of the province are associated with Jura-Triassic rocks he states that the most important occurrences of these rocks along the route of the railway are: The Birken Bank, extending from north of Anderson Lake to Birkenhead River; Pemberton Band, lying between Spetch and Pemberton; the Mons Band, extending from Green Lake to Cheakamus River; while smaller bands are found at Watson, Brew and Bethel. These localities, therefore, are of special interest to prospectors.

"These conditions," Mr. Camsell continues "are most favorable for the occurrence of metallic deposits of copper, lead, zinc, gold and silver, and the whole interior of the coast mountains of British Columbia, therefore, becomes an excellent field for prospecting, and not only the eastern and western borders as was formerly believed to be the case. Fortunately the magnificent system of deep fiords that cut deeply into the heart of the ranges makes it possible to prospect for these bands of stratified rocks and to easily develop any ore deposits that may be found in them. Prospectors, therefore, are urged to pay more attention to the coast mountains than they formerly did."

Referring to the deposit of limonite at Alta Lake, which is now being developed for the purpose of supplying a fluxing material for the Irondale Wn. Smelter, Mr. Camsell states that it covers an area of 60,000 sq. ft., with a length of 450 ft. and a width of 250 ft. Analysis is given of 40.98 to 48 per cent metallic iron; 0.2 per cent to 1.80 per cent sulphur; 0.1 to 1.88 per cent phosphorous; and 1.24 to 2.2 per cent silica. Other small deposits of similar ore occur in the neighbourhood, originating from the decomposition of pyrite bearing rocks.

An examination also was made by Mr. Camsell of the district adjacent to the headwaters of the Indian River, where several claims have been located east of the Britannia Mine ore zone. He considers most of the deposits of a character different from that of the Britannia. A band of stratified rocks a mile or more in width extends along the valleys of the Indian and Stamish Rivers. These rocks are surrounded by the granite batholith and intersected by numerous dykes.

On the Belle group are four outcrops of ore which are respectively four feet, seven feet, ten feet, and thirty feet in width, and from which samples are said to average 3 per cent copper. The Bulliondale group is located on an extension of the same ore zone as the Belle. The London group has a large iron-stained outcrop in granodiorite, through which the pyrite is abundantly disseminated with a little chalcopyrite and some molygdenite. The Roy group was purchased last spring by the Britannia Mining & Smelting Co. for $25,000 cash, and Mr. Camsell found on this group copper ore of high grade covering a surface area of 2,300 square feet. Bunches of pure chalcopyrite are common. Development consists of stripping and diamond drilling.

Mr. F. M. Bancroft, of the Geological Survey, makes a summary report on the Slocan District in which connection he refers to the Manganese Deposits near Kaslo, B.C., and points out that the primary silicate, rhodonite, occurs in Ainsworth, Yale and Kamloops mining divisions. A close search, it is suggested, should be made for ores of zinc and superficial ores of manganese in the vicinity of these deposits. The mineral occurs near Kaslo in a vein three feet to four feet wide, between graphic schist and chlorite schist and is due to hydrothermal solutions occurring along a contact fissure.

The secondary deposits of manganese near Kaslo are declared to be the most notable yet discovered in British Columbia, the grade being good and averaging 48.14 per cent manganese and 1.65 metallic iron.

With reference to the Lardeau Mining Division, Mr. Bancroft states that the surface indications in the Lardeau Valley and through the whole central mineral belt are good and merit more intelligent investigation for gold, while the mineralization compares favorably with that of Sheep Creek, Ymir, Nelson and Bridge River. There are silver-lead deposits at the head of Cascade, Poplar, Tenderfoot and Mobbs Creeks. Manganese, tin, platinum and nickel are to be regarded as minerals of possible importance in this district and it is pointed out that pyrrhotite from the Queen Victoria mine at Beasley, west of Nelson, carried 0.41 per cent nickel.

Lorne Mine, Cadwallader Creek.

One of the promising gold properties of the Cadwallader Creek District, Kamloops Mining Division, is the Lorne Mine. During the past year, owing to labor scarcity and the comparatively low value of gold, the work has been confined largely to development. From development there were milled about 380 tons of rock yielding 192 oz. gold and 37 oz. silver.

Pioneer Mine.

The Pioneer Mine is another gold property of Cadwallader Creek which has been operated steadily during the greater part of the past year. Milling was started on the 10th March last and ceased on the 21st of July following. The sinking of a shaft was continued from the latter date, and now is down 280 feet from the collar. Drifting has been carried on at the 280 foot level for 120 feet and good values are shown. Headgear, hoist house and blacksmith shop were destroyed by fire on November 17th, but milling is expected to recommence in a short time. Gold produced during the year up to the 16th November totals 1,925 ozs., and it is estimated that the output to the end of the year will aggregate 2,500 ozs.

Plant Installed at Ida May Mine.

At the Ida May Mine, also situated in the Cadwallader Creek District, a reduction plant consisting of a small jaw crusher, a Huntington Mill, with a capacity of 10 tons every 24 hours, and an amalgamating table were installed during the past year. Power is supplied by a 10 h.p. gasoline engine. In a trial run 30 oz. of gold was secured. The property now is closed down, but it is expected that it will be again operated in the spring.

Mr. F. H. Hawkins, who for several years past has held the position of Chief Assayer for the Standard-Silver Lead Mining Co. of Silverton, B.C., has gone to Anyox, B.C., to accept a situation with the Granby Consolidated Mining & Smelting Co. Mr. Thomas Brown will succeed Mr. Hawkins at the Silverton Assay Office.

Shell Company Would Explore Northern Alberta for Oil

A story comes from Ottawa, by way of Winnipeg, which has aroused considerable comment and even excitement in the Canadian west. It is to the effect that a British corporation, the Shell Transport and Trading Company, Limited, is to be given a blanket concession to enter upon and develop all the oil-bearing lands of Canada lying in the Province of Alberta and north of the Athabasca River. The company is to have a free swing for five years to investigate the geological conditions of this vast territory and develop the same. The concession is to be in the nature of a vast monopoly, except that the rights of prospectors and lease-holders already on the ground are to be respected. The company is to do the exploration and development work at its own expense. The oil thus produced is to be handled by the company, which agrees to pipe it to the head of the lakes or to Vancouver. The company is to have a return of six per cent upon its investment, and the remaining profits are to be divided on a fifty-fifty basis between the oil company and the Dominion Government.

The story is substantially set forth in a despatch from Ottawa to The Manitoba Free Press, the leading newspaper of western Canada and a staunch supporter of the Union government. The Free Press correspondent says that the initial negotiations were conducted last summer in England between the directors of the Shell Transport and Trading Company, Limited, on the one hand, and on the other hand by Sir Robert Borden, Hon. N. W. Rowell, Hon. Arthur Meighen and Hon. J. A. Calder, representing the Dominion Government. No conclusion was thus arrived at, but the proposal is not said to be under consideration by the cabinet at Ottawa, and a devision is expected at an early date.

In justification of the proposed concession, it is stated that the vast oil-bearing lands of Alberta, are not being developed as they should be, and that the only oil company in Canada of sufficient financial strength to undertake their development is the Imperial Oil Company, a subsidiary of the Standard Oil Company of the United States. It is felt that the vast deposits of oil north of the Athabasca should be kept under British control and that if not developed by the Dominion Government as a national undertaking its development should be entrusted to a British corporation. The Shell Transport and Trading Company, Limited, has a capital of fifty million dollars and has large holdings in oil and concessions for the development of the same in Rumania, Egypt, Borneo, Sarawak and the United States.

The Ottawa correspondent of The Free Press evidently considers the proposed bargain to be a good thing, and in the course of his despatch says: "Under the present system of oil exploration in the Dominion private individuals may secure a lease on 1,900 acres. They have little in the nature of expert geological recommendations to go upon. Moreover, if they do strike oil the problem of refining it and bringing it to market is still to be faced. There would appear to be only one company in the Dominion capable of meeting that problem at the present time, namely, The Imperial Oil. But there are no indications that that company desires to embark upon Canadian oil exploitation in the west. The Shell Company undertakes, if oil is found, to establish refineries and to undertake the piping of the oil to the head of the lakes or to Vancouver. The proposal has but recently come before the cabinet. It is under consideration now and a decision one way or another may be expected at an early date."—Toronto World.

H. H. STEVENS URGES GOVERNMENT OWNERSHIP OF SMELTERS AND REFINERIES IN BRITISH COLUMBIA.

Government ownership of smelters and refineries is advocated by Mr. H. H. Stevens, member of the Canadian House of Commons for Vancouver, B.C. Discussing the possibility of the development of a large metal manufacture trade in the Pacific Northwest, Mr. Stevens said that it was a matter which he had taken up with the Dominion Government, and with experts retained by the government. "In my opinion," he said, "we must begin, in British Columbia, with copper, zinc and lead. The first two are essential to the manufacture of brass. There is not only the home market in Canada, but a huge trade to be developed in the Orient in all kinds of metal manufacture." The raw materials were to be obtained by the establishment by the Dominion Government from its own smelters and refineries on this coast. Concerning the ore supplies necessary, he stated:

"As the mineral resources and their administration are under control of the Province, the co-operation of the Provincial Government would be necessary. As a carollary to the establishment of a Dominion smelter and refinery it would be necessary for the Provincial Government to impose such restrictions on the export of ore as would tend to direct these supplies to the Dominion smelter and refinery. It goes without saying that the smelter would have to give terms equal to those of the present smelters on the coast.

"As everyone knows, all the big mines and smelters except those of Trail, B.C., are owned by the American 'Copper Ring.' And even Trail is in the hands of the 'Ring' when it comes to marketing its product.

"The effect of a smelter operated in Vancouver would be to break the monopoly of the American 'Ring' as far as the metals of this Province are concerned. The Government could carry its product until market conditions were favorable, which might not be possible with a privately owned concern.

"No doubt, too, the establishment of such a smelter would result in the development of many new mines up the coast, and the extension of those now opened up as a constant market for their ores would be provided.

"Australia, Japan, China and all the other trans-Pacific countries use large quantities of manufactured metals, purchased largely in the United States. Our own raw metals go into those manufactures and American manufacturers derive the trade and the profit.

"The question of a smelter is now before the Government, backed by all the members from British Columbia and it will likely be brought up in the House of Commons during the coming session."

The Mining Convention, which was to have been held in Vancouver, B.C., under the auspices of the Vancouver Chamber of Mines during the first week in January, 1919, has been postponed indefinitely.

Rossiter W. Raymond

Secretary Emeritus, American Institute of Mining Engineers.

Dr. Raymond, to whom the term dean of mining engineers was fitly applied, passed away at his home in Brooklyn, N.Y., on Tuesday, December 31st. While the American Institute of Mining Engineers, with its world-wide membership, will always remain a monument to his genius, he was no narrow specialist. He was not only a great mining engineer, especially in the services rendered by him to the jurisprudence of mining, but was one of the greatest authors and one of the most eloquent speakers of his or any other generation in the technical world. At the dinner given by his friends in commemoration of his seventieth birthday, in New York, in 1910, Dr. Raymond's activities were epitomized by his pastor, the Rev. Dr. Lyman Abbott, of Plymouth Church, the successor of the great Beecher, as those of "sailor, soldier, engineer, writer, author, teacher, biblical critic."

Dr. Raymond was born in 1840, and when 18 years of age he set sail for Europe as a student. He became a recognized mariner before landing . . . . .

"The good old Black Ball liner 'Great Western,' on which I embarked as a passenger in 1858, and became the third mate before the long, disastrous voyage was over, and the crippled vessel, with half a rig and half a crew, and on half allowance of water, crawled down the Irish Channel to reach Liverpool, and surprise the underwriters.

"After that initial unforeseen experience, I was brought by sea and land into contact with many peoples and many literatures, in scenes of peace and scenes of war; and I can now see that I unconsciously obeyed the maxim of Browning,

'Get thy tools ready,
God will find thee work.'

So that, when my work came to me, I was, without my own prevision or predecision, prepared to understand it, to love it, and, up to the measure of my strength, to do it."

From 1861 to 1864, Dr. Raymond served in the Union army in the great civil conflict.

A well known poem by Dr. Raymond is entitled The Grand Canyon, "the first line of which declares the great truth that the thoughts of God are on earth expressed."

As an author and critic, outside the domain of mining, it has been said, "Dr. Raymond has written excellent stories and his commentary on the Book of Job is a fine piece of biblical criticism."

Many writers, with more facile pens than ours, will describe Dr. Raymond's accomplishments and his achievements. We cannot do better for Canadian readers than to give quotations from speeches made by him in this country. They are messages to us which apply as well to-day as when they were delivered. Furthermore they illustrate Dr. Raymond's style as a speaker and a writer and his breadth of view.

During the last twenty-five years, under direction of Dr. Raymond as secretary, the American Institute of Mining Engineers has honored Canada by holding four meetings in this country. The term American, in so far as the Institute is concerned, as Dr. Raymond was fond of emphasizing, means North American, and does not apply merely to the territory south of the Great Lakes. The Institute has always had an active membership in Canada and this country has almost always been represented on its Council or Board of Directors.

In 1893, the Institute met in Montreal, with excursions in the adjacent parts of Quebec. In 1900 Quebec and Nova Scotia were visited. The British Columbia meeting of 1905 included an excursion to the Yukon. The mining men of Ontario had the pleasure of acting as hosts in 1907, the sessions being held in Toronto, with excursions to Northern Ontario.

At the meeting in 1900 the reverend Dr. James Douglas was President of the Institute. The following is from a speech at Sydney during that meeting by Dr. Raymond, with which most of us will agree as to the great benefits, other than technical, that are derived from membership in such societies as the A.I.M.E.

"I have been connected with the American Institute since 1871; it then had thirteen members, but it now has three thousand. If you come to any meeting of that Society and think that by sitting down in a hall and hearing some papers read you have struck the heart of that society you make a huge mistake. It is on the train, in the wagon, at the hotel over the evening pipe—I am afraid sometimes it is over the evening hot Scotch—that you will find the real work of that Institute going on. We learn more in our interchange of reciprocal feelings, we teach more in our talks, in our clasping of hands, in our social intercourse, than we do on the printed page . . . . It is not a question of piling up statistics as a permanent record, but it is a question of welding these people who do things into a social, harmonious and organized institution. Our institution was the first on this continent to do that on a large scale, and these societies of ours have welded together a great profession and made it a great factor for happiness and prosperity and knowledge among men. That is why I like to hold meetings anywhere."

At the Toronto meeting a reception was given by the Government in the parliament buildings to the members of the Institute and their guests. Adjournment was made to the legislative chamber, where several addresses were delivered. A part of Dr. Raymond's speech on that occasion may be quoted:

"I have spoken a good many times on Canadian soil. Some of you remember that in Vancouver, two years ago, I paid a hearty tribute to the achievements of Canadian engineers: and some may recall my address on the same subject, made in 1889, at Ottawa, in the presence of that great man—great man, I say, whatever party judges him!—Sir John Macdonald. I could only repeat to-night what I have said before, but with added emphasis. Years ago, I supposed that the conquest of this continent had been completed. I remember being very eloquent, somewhere or other, about the way in which the American mining engineer went on into the wilderness; and how Nature, which had lain for thousands of years in sleep and solitude and silence, like the Beauty in the fairy tale, woke at his coming, and rose, and smiled and gave herself to him, with all the glory of her beauty, and all the bounty of her treasure. Oh, I was very eloquent about that! I thought it had all been done; and that we had done it—we Americans; and I told the

young men of my generation that they might yet achieve great things, but not so great as the achievement of their fathers; that they might live to see wonderful epochs in human history, but there would be no future age like that, because there were no more worlds to conquer. The 'winning of the West' I thought we had completed. But lo! here was another empire in the North; and that world, too, our tall Canadian brethren are conquering. All hail to them! May they do better than we have done! But let them never forget that we and they follow a common purpose and share a common glory!

Among the numerous biographical notices of departed members of the Institute that Dr. Raymond wrote, quotations from one are especially appropriate at the present time. Many young men are now returning to Canada from the Great War, as did Dr. Raymond, and the subject of his sketch from the great strife nearly 55 years ago. Many of our young men have had their school and college courses interrupted, and will now find it hard to take up their work again. Will there not be encouragement for them in the life of one who, in the long ago, like them faced similar difficult conditions and triumphantly overcame them!

"Upon his discharge in 1865, he returned at once to his rural home and took up his life again, just where he had laid it aside. I had almost written 'laid it down'—and if I had done so, I could have defied the critic, and the proofreader, for he had as truly laid it down as if the sacrifice had been accepted and ratified by death. That the life thus freely offered was returned to him, did not impair the completeness of the sacrifice. His escape from the death he had dared was only a Voice which said, 'I have further use for thee!' So, at least, I understand it; and so, at least, did he! And I must add here, as a part of my picture of the man, that he never 'traveled' on his military record. He did not run for office on the strength of his army service, or urge it as a claim to civil distinction or preference. I think he regarded it as an episode, such as every good citizen should meet like a man—without bragging about it afterwards. I think he would as soon have paraded his honesty as his patriotism. Such things, in his view, 'go without saying,'

"So the crippled veteran of 23 went back to the Oxford Academy to prepare for college, with nothing to show in that line for the three years he had lost except when he had managed, in camp, to get out of his Latin grammar and reader, and, possibly, also a certain amount of fidelity, patience, and indomitable perseverence and courage, which had been both revealed and trained in the service of his country. And in 1867, as a man of 25 years, he modestly entered the Freshman class at Yale, along with a host of youngsters, who had not wasted any time in soldiering. Moreover, he did not cut short his college course on the ground that so much time had been lost, but went through the whole of it, shirking nothing, just as if it had been simply another campaign, and finally, in 1871, he took his degree as A.B. with his class."

. . . .

"At this point, I would pause again to call attention to the exceptional character of this example. Here is a man who has become 32 years old before entering upon his professional work. The delay has been due to intervals of three years and one year, sacrificed by the man himself, at the call of what he deemed higher duty—the first to patriotism, the second to presonal honor. But the original plan of the youth has been carried out, irrespective of these interruptions, without one iota of abridgement or change; and the man stands at 32 where he might have stood at 28, or even (if he had decided to ship his classical college-course, and plunge at once into his technical course) at 24.

"Yet, does he really stand only where he would have stood four or eight years earlier, if no time had been 'lost'? Is it nothing that a man, having been a soldier, knows how to be a comrade—to meet and understand and win to hearty co-operation other men? Is it nothing that, having gained through a classical education the ability to comprehend the lessons of history and the inherited associations which actuate, even unconsciously, the men of to-day, he is able to communicate convincingly to others what he knows himself? Is it nothing that he has shown himself to be a lover of his vocation, yet capable of sacrificing even his vocation to duty and honor? Finally, is his certified professional ability less likely to win professional employment and success, when backed by that other certificate, furnished by a wide experience with men and their enterprises? These, and other like questions are answered by the subsequent career."

The American Institute of Mining Engineers was founded in 1871. At the organization meeting at Wilkes-Barre, Dr. Raymond was elected temporary secretary. He was President in the period 1872-1874. In 1884 he was elected Secretary, a position he occupied till 1911, when he became Secretary Emeritus. During this period he saw the membership grow to over 6,500, at the end of 1917, with a corresponding increase in usefulness and influence.

Many honors were bestowed on Dr. Raymond by universities and technical institutions. Of these it will suffice to mention that he was an Honorary Member of the Iron and Steel Institute of Great Britain, of the Institute of Mining and Metallurgy and of the Societe des Ingenieurs Civils de France. — W. G. M.

DECLINE IN U. S. GOLD AND SILVER OUTPUT.

Washington, January 2.

Gold production in the United States in 1918 fell to 3,313,000 fine ounces, worth $68,493,000, the lowest in twenty years, and silver production dropped to 67,879,000 fine ounces, worth $67,879,000 at the standard Government price of $1 an ounce, the smallest record since 1913, according to the joint preliminary estimate of December of the Mint Baker and the Geological Survey, issued recently.

Return of normal conditions and falling of prices are expected to stimulate gold production in the United States this year, according to views of members of the Treasury's Committee appointed to suggest a remedy for the falling production of last year. Consequently it appears unlikely that the committee will recommend any unusual measures to stimulate production when it makes its report in a week or two.

Rapid mounting of the cost of mining is assigned as the cause of the decline, which is shown by comparison with the 1917 production of $83,750,000 worth of gold and 71,740,000 ounces of silver.

Metal Producers Expect Temporary Lull In Business

Victoria, B.C.

With the announcement, made a few days ago, that British Columbia copper ore shippers to the Tacoma Smelter will have to content themselves with a settlement hereafter on a basis of 11 cents a lb., mining men are speculating as to what is ahead of the industry. Producers here must receive at least 10 cents for blister copper on a 15 cent. market, or discontinue, as there must be allowance for transportation and treatment charges. That the Government price in the United States of 26 cents a lb. is purely nominal and that it is not likely to continue for long in any event, in view of the very large excess supply which the end of the war found on hand, is thoroughly appreciated by those interested. Consequently they are asking themselves what is to be done to right conditions. It is felt that the outlook is not very bright, as far as the immediate future is concerned, at any rate, but there is general confidence that, with the end of peace negotiations and the inauguration of a period of re-construction the demand for copper will become so brisk that the industry of the Province will find itself again with plenty of orders and continued activity assured. By the time this occurs British Columbia will be, or should be, in a position to very materially increase her output, which for 1918 will approximate 60,000,000 lb. The Canada Copper Company will be producing from the Copper Mountain property, and both the Consolidated Mining & Smelting Co., and the Granby Consolidated Mining & Smelting Company will have developed mainland and island properties to the point where they will take places among the large shippers of the copper properties of the Canadian west.

The position with respect to lead is another matter which is giving some concern, inasmuch as the price has fallen, according to information at the time of writing to 6¾ cents a lb. It will be recalled that the Consolidated Mining Company's management at the Trail Smeltery recently issued an order in which it was stated that, owing to the fact that a serious condition had arisen in the Canadian lead market, interest would be charged on money advanced to lead producers. In the course of the announcement reference was made to a large quantity of lead which is in the hands of the Imperial Munitions Board, and is "hanging over the market." This lead is in Canada, and it has been learned that the Imperial Munitions Board has arranged for its exportation, with the idea of relieving the embarrassment which its presence causes to the Canadian market. Mr. F. A. Starkey, of the Associated Boards of Trade of Eastern British Columbia, expresses himself as highly gratified with the latter development, saying: "The sum and substance of the whole thing is that we will now have a clean sheet to start off with. The action of the Board is timely. On December 9th, while in Spokane, I sent a wire to the Board pointing out that the dumping of the lead bought for munitions on the commercial market at this time would mean a glutting of the market, and that would be disastrous to the lead mining districts. But the difficulty is now settled." Mr. Starkey's wire to Sir Thomas White, Acting Premier, read: "During war shippers did not have benefit of Canadian duty, but sold Imperial Munitions Board at practically U. S. prices. Now that the war is over shippers expect that Canada will not be made a dumping ground for Mexican and U. S. surplus and scrap metal." Whether the action taken by the Board with reference to the stock referred to will have the effect which Mr. Starkey looks for is doubted by some who point out that Canada's biggest market is not local, and that the placing of munition lead elsewhere will have the result of reducing the demand for the Canadian production at least for a time, and that, at the best, the prospect is that there are a few dull months to meet.

Zinc at 7¾ cents a lb., with a comparatively inactive market as far as the output of British Columbia is concerned, is not very promising to the industry, but the Consolidated Mining & Smelting Company, it is felt, will be able to keep its refinery in operation by virtue of the bounty provided by the Dominion Government.

The future, however, looks much brighter for gold and silver properties. Gold producing mines are preparing to increase production, and it is confidently expected that in the coming months British Columbia resources in this respect will be largely developed, and those which are past that stage will be exploited to capacity.

The platinum placers of the Tulameen River are likely to receive attention at the hands of private companies, the operations of the Dominion Government in this locality having demonstrated the possibilities. The cessation of the war having affected the demand for molybdenite, chromite and manganese, it is not probable that there will be the active prospecting for these ores that has marked the past year or more. What will be done with the properties of this character located, and to some extent developed, remains to be seen.

The whole situation, to the minds of western operators, appears very complicated. To use their own words "the whole thing at present is mixed up, unsettled and unsatisfactory. We are in for a period of slack times evidently; but it is not likely to last more than for the period of peace negotiations. With an European settlement and the actual commencement of reconstruction there is no doubt that the demand for copper, lead, zinc and other ores will be revived and the industry will jump back as far and beyond the position which it gained during the war. Meanwhile, it is hard to say what is going to happen. We believe, however, that the smelters will be able to continue operations, possibly not on as large a scale, but sufficiently to tide over the hiatus."

RESTRICTIONS ON EXPORT OF BRITISH MANUFACTURES REMOVED.

Important cable dispatches have been received by Mr. G. T. Milne and Mr. F. W. Field, the British Trade Commissioners at Montreal and Toronto, respectively, from the Imperial Department of Overseas Trade in London pointing out that since the armistice was signed many restrictions on commerce have been withdrawn, while in the case of those which remain, licenses are being granted much more freely than previously. Particulars regarding these relaxations will be published weekly in the "Board of Trade Journal," the official organ of the Imperial Government for notices regarding trade.

Orders placed during the war period now have good prospects of being executed, and arrangements for

new business should be made without delay.

The following relaxations in particular should be noted:—

1. Permits to manufacture and Priority Certificates in connection therewith are no longer necessary.
2. Firms are at liberty to accept civil or commercial orders for immediate execution, thus freeing the engineering industry among others, for commercial work.
3. All the principal kinds of raw materials may now be used for the commercial manufacture of goods for export, but these raw materials themselves may not be exported in certain cases without licenses. Among those to which this condition applies are the following: Aluminum, antimony, brass, copper, iron, lead, nickel, spelter or zinc, steel and tin.

In general, restrictions on the export of manufactured goods have been removed, while they have been retained in the case of raw materials.

CONSOLIDATED MINING & SMELTING CO. OF CANADA.

An Active Year, but a Decrease in Profits.

An active and in some respects an expanding business, but one showing less profit than during the previous year, is revealed by the annual statement of the Consolidated Mining & Smelting Co. of Canada, which carries on large operations in British Columbia. The net profit for the year ending September 30 last was $867,259, compared with $1,076,828 in the previous year. This was after providing for $81,986 in taxes, writing off $408,557 for depreciation, and charging profit and loss account with $219,202 in development of properties during the past year. In 1917 $648,058 was written off for depreciation and $380,071 charged for development.

"Taking into consideration the recent improvements in metallurgical processes," says President W. D. Matthews, "and the enhanced value of the company's mining properties on that account, your directors decided to continue payment of dividends at the rate of 10 per cent per annum, charging to profit and loss account the deficit of $180,485. The balance at credit of profit and loss account now stands at $2,148,122." The balance at credit of profit and loss a year ago was $2,360,274. The season's metal product exceeded $10,500,000 compared with $13,000,000 in 1917.

"The continuous increase of the scale upon which the company has been operating for the purpose of meeting the copper, zinc and lead requirements of the Imperial Munitions Board," says Mr. Matthews, "and the development of new processes, especially those involved in the electrolytic treatment of complex zinc ores, have involved the expenditure of a large amount of money for new plant, but your directors hope that the result will be that the company will thereby be able to produce metals profitably at prices which may be expected to prevail under peace conditions. The cost of the new construction which was found necessary from time to time greatly exceeded the estimates by reason of the excessive and continually increasing costs of labor, materials and supplies of all kinds. Your directors, owing to these increased expenditures and to the interruption of operations during the first part of the year, have not been able to reduce the bank overdrafts as had been hoped and expected."

An issue of $3,000,000 in 7 per cent debenture bonds is planned. The power development of the West Kootenay Power & Light Co. will be extended and the copper refinery capacity increased from 20 tons to at least 50 tons per day. These capital expenditures will amount to at least $1,500,000. The company's assets are now placed at $17,099,923, compared with $16,994,568 last year.

Reports of company officials speak of the high cost of materials, delicate labor situation, and decision of the Imperial Munitions Board to pay but little if any more for lead requirements than these could be secured for from foreigners, though costs are higher in Canada. "At the same time," says Mr. James J. Warren, the Managing Director, "it must be realized that war activities have resulted in the establishment on a firm footing in Canada of industries engaged in the production of high-grade zinc and refined copper. The fabrication of these metals is bound to follow in due course."

FOUR ROPE HOISTING SYSTEM FOR NANAIMO COLLIERIES.

Experiments have been at progress at the collieries of the Canadian Western Fuel Company, Nanaimo, B. C., for the last two months in the effort to arrive at a solution of the problem of rendering impossible, or reduring the possibility to a minimum, a repetition of such an accident as that of last September when the rope used in Protection Island Shaft broke, causing considerable loss of life.

The ingenuity of Mr. Thomas Price, master mechanic for the company, has resulted in an arrangement which seems to come very close to meeting requirements. He has devised, and demonstrated its practicability in actual operation, a working model of a four rope hoisting system.

Mr. George Wilkinson, Chief Inspector of Mines, describes the arrangement as follows:

"There are four complete hoisting ropes, an overwind rope and an underwind rope on each compartment of the drum. Four pulley wheels are used, two of them being set some distance above the other two to avoid fouling of the ropes.

"The ropes on the two upper pulleys cross. A drum of the usual dimensions is used. Having an overwind and underwind rope on each compartment, the one rope is being unwound while the other is being wound.

"As the under rope is being wound on the drum and hoisting the cage, an overwound rope is being unwound and descending with the cage in the opposite compartment. The operation is the same on the other side of the drum. The whole operation is made feasible by simply crossing the two ropes that lead to the two upper pulleys."

Mr. Wilkinson asserts that this is one of the simplest and most practical arrangements he has seen on using safety ropes. He points out that everything is under control of the engineer, the same hoisting speeds being used on all ropes. Any possibility of slipping is avoided because all ropes are fastened to the drum.

Preparations are being made by the Western Fuel Company for the installation of this double rope system at their new mine, the Wakesiah, near Nanaimo, B. C.

The Canadian Honorary Advisory Council for Scientific and Industrial Research*

By DR. A. B. MACALLUM.

"Reconstruction and Development" in Canada in the new era of international girding for supremacy in the arts of peace means to the Canadian Honorary Advisory Council for Scientific and Industrial Research much in so far as "development" is concerned, but little in regard to "re-construction." Re-construction postulates the building up again of what existed before; and up to the outbreak of War there was constructed in Canada no national organization for research work. The glowing path of Canada's opportunity for industrial development runs wide and far, but the Council's research path has to be blazed through a comparatively unexplored forest. It is almost entirely new ground to be covered.

Where Germany and, though perhaps in lesser degree, the United States had builded before the war great organizations for industrial research founded on wide-visioned realization of the commercial value and necessity of applying science to industry, in Canada, as in Great Britain, state encouragement and individual enterprise had, until the war started, been content in the main with a laisser-faire policy. Germany had her trained technologists and research workers by the thousands in every field of industry, and, through the organized application of science to industry, was winning her trade victories in every foreign mart.

In the United States, which early took a leaf from Germany's book, the great Universities like Harvard, Yale, Chicago, Columbia and Cornell had staffs and equipments in pure and applied science, which kept pace or almost kept pace with the demand from great American industrial establishments for trained scientific investigators, chemists, electrical engineers, metallurgsts, etc. to solve industrial research problems. The annual budget of the Massachusetts' Institute of Technology, for instance, exceeded before the War, and still exceeds, the total of the annual expenditures of all the Faculties of Applied Science in Canada. There are some two thousand research laboratories in connection with large industrial concerns in the United States, and each of more than fifty individual firms expend annually sums ranging from $25,000 to $500,000 for research.

In Canada in a score of years less than twenty students have received the advanced (Ph.D.) degree in science from the University of Toronto and fewer still from McGill. Not two per cent. of Canadian firms have research laboratories and only about ten per cent. have routine laboratories, chiefly for the testing of materials. If Canadian industries were to seek for a supply of trained technical men capable of applying the most advanced scientific knowledge to industrial processes sufficient to meet even their most ordinary needs, the number of adequately trained men available would not be sufficient to satisfy five per cent. of the demand.

That, briefly put, is the situation with regard to the needs in Canada for equipment and men for research work. That is the situation that has confronted the Research Council since its creation in December, 1916. And that has been, and is, the crux of all problems of scientific and industrial research in Canada, handicapping the carrying out of the large research programme planned for the past year and for the coming year, jeopardizing Canada's position in the international rivalry for export trade and demanding prompt remedy if the full measure of our opportunity is to be grasped. In resources of capital and materials, in all the natural advantages for industrial supremacy we are in an enviable position as compared with our trade competitors. But in regard to the vital question of scientific organization of our industrial processes of finding new uses, hence new markets for the raw materials and the by-products of manufacture, and of keeping pace with the advances made in other countries through research, we have as yet hardly touched the fringe of opportunity.

Confronted with this situation and with a slowly awakening public and individual realization of its portent, the main task of the Council this past year has been, while carrying on the immediate needs of research work with the means at hand, to pave the way for meeting adequately the urgent needs of the future. The goal has been a supply of trained men for research work, adequate equipment and facilities for research and the enlistment of industrial organizations in co-operative effort to solve common problems, the solution of which lies in the application of science to industry.

A Central Research Institute.

The great forward step taken has been to promote the establishment of a Central Research Institute at Ottawa, combining the functions of the Bureau of Standards at Washington and of the Mellon Institute at Pittsburgh.

The proposal for such an Institute, submitted to the Government in November last, was the result of many months' careful investigation by the Council.

In view of the situation above outlined, the argument advanced in support of it is so obvious as to need no re-statement here. There has been a prompt and appreciative response to the proposal by the Government and by all the public interests concerned. There is good reason to believe that the Institute will be established without any unnecessary delay. It will involve an expenditure of $500,000 for a four-storey building, having initial provision for fifty laboratory rooms and with plans so drawn as to provide for expansion as the needs develop. The cost of the scientific equipment is estimated at $100,000, and the cost of maintenance, salaries, etc. at about $100,000 per annum for the first few years.

Trade Guilds.

The establishment of the Institute is the necessary first step towards placing industrial research work in Canada upon an adequate and permanent basis and towards enabling the Dominion to keep abreast of similar progressive methods in the United States, Great Britain, Japan, France, Australia and our other trade competitors. It will, doubtless, be followed by the or-

*Written for the Toronto Globe's annual financial survey issued on Jan. 2, 1919.

ganization of trade guilds or associations for research in each branch of industry, formed to pool resources in solving common problems and to take advantage of the laboratory equipment and opportunity offered, under the Council's proposals, by the Government-maintained Institute.

Training of Scientific Workers.

A further necessary step will be the working out of the Council's plans for more adequate provision by the Universities for the training of qualified scientific workers. In the more generous investment of state funds for this purpose, starting, say, with Toronto, McGill, and L'Ecole Polytechnique, lies the hope of securing for the ensuing years of the world's strenuous and pitiless trade warfare the nation's leaders in scientific and industrial research.

Research Problems Undertaken by Council.

Apart from these crucial phases of the work and aims of the Research Council, space permits only passing reference to some of the many research problems already undertaken.

$400,000 for demonstration plant.

As a result of the Council's initiative, Governmental action was taken in June last to secure federal cooperation with the governments of Saskatchewan and Manitoba in establishing a demonstration plant in the Souris coal areas of Southern Saskatchewan, to prove the commercial feasibility of carbonizing and briquetting the Western lignites for heating, in domestic furnaces. This year will see a plant established with an outlay of $400,000 and an annual output of 30,000 tons of coal equal to the Pennsylvania anthracite and marketed in Regina or Moosejaw at, at least, two dollars per ton less than the imported anthracite is now costing. The success of the initial plant, about which there can be little doubt, will lead eventually to the development of the immense and little realized latent lignite resources of Saskatchewan and Alberta, relieve for for Ontario and Quebec the present coal famine through limited American supply and save to Canada the five or six millions of dollars now annually going to the United States for coal for the prairie provinces.

Study of growth of trees.

A systematic study of the rate of reproduction and growth of Canadian forest trees of the commercial species has been undertaken through scientific survey of some eighty square miles of an old cut-over lumber district on the Petawawa Military Reserve. The data being secured will in the course of a few years give, for the first time, the essential definite information enabling the Dominion and Provincial Governments to inaugurate on a scientific and practical basis a scheme of re-forestation paralleling the best results obtained in the past in Europe. Our forest wealth, now in danger of exhaustion through reckless waste and disregard of adequate conservative systems, can only thus be preserved as a great and permanent national resource.

Tar fog research.

The tar fog research, initiated in 1917, has been continued with satisfactory practical results which will doubtless lead in the near future to the application to various plants in Canada of a new electrical process for the recovery of valuable by-products now lost in the destructive distillation of coal, wood, etc.

The research on sound measurements and fog signalling conducted in 1917 by Dr. Louis King of McGill has made further progress this year and forecasts a new type of sirens for use on the St. Lawrence River and Gulf.

Research work connected with the recovery of industrial alcohol from the enormous sulphite liquor waste of our Canadian pulp mills points to the installation of recovery plants and the production in Canada, at decreased costs to consumers, of the alcohol increasingly needed for industrial purposes and as a substitute for motor fuel.

There has been a score or more of other phases of industrial research initiated or continued during the year, each having a practical bearing on some branch of national production. More should and could be done, were trained men and money available. The Council's budget for the year has been under $100,000. In Great Britain, Parliament has recognized the need and the opportunity by creating a separate Department of Scientific and Industrial Research and has voted one million dollars per annum for five years to be expended by the Research Council. In Canada we, too, are learning the obvious lesson taught by Germany and already adopted by British industry. The path has been blazed for replacing rule of thumb methods in Canada by scientific investigation.

Special Correspondence

BRITISH COLUMBIA.

Will Install Plant at Meteor Mine.

The Meteor mine near Slocan City, B.C., has been bonded by Messrs. J. C. and W. A. Buchanan, the consideration given being about $45,000. It is a silver mine, but the ore carries also gold values. Twenty-two tons of the high grade ore was shipped to the Trail Smeltery recently. It is the intention to install a compressor in order to facilitate the carrying on of development work on a large scale. Mr. W. A. Buchanan will manage the mine

Aerial Tramway for Mountain Chief Mine.

Another gold-silver property of British Columbia to change hands recently is the Mountain Chief at Renata, which was bonded by J. W. Evans, of Revelstoke, B.C., the figure involved being understood to be $100,000. Mr. Evans plans to carry on operations in a more extensive manner than the previous owners, one of the first pieces of work to be undertaken being an aerial tramway from the mine to Arrow Lake. With this facility for transportation he figures on materially increasing the present output of 200 tons a month.

Cassiar Crown Strikes Good Ore.

The strike of a considerable body of copper ore of good grade is reported from the north of British Columbia, Hazelton District. The property on which this promising development has taken place is owned by the Cassiar Crown Copper Company. Although work has been maintained for several years past, nothing of special note was discovered, though there was sufficient ore of good quality shown to encourage the owners. Early in the past summer the company awarded a contract to run a short tunnel on the Ruby Claim, one of the group. A short time before the contract was completed the crew began breaking into ore, which widened with every round until, with the completion of the tunnel contract, they had exposed a vein fourteen feet in width with ten feet of clean ore.

Constructing Tipple at Diamond Vale Mine.

At the Diamond Vale Mine, Merritt, B.C., a tipple is being constructed in order to permit an early resumption of operations. The mine has been idle for some time.

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Powdered Fuel More Economical Than Oil?

It is reported that the use of powdered fuel by the B. C. Sugar Refinery, Vancouver, B.C., has proved satisfactory and that, as a result, the Powell River Pulp and Paper Company, and the Ocean Falls Plant of the Pacific Mills, Limited, are likely to adopt the same system. It is said that powdered fuel has been shown to be more economical than oil in this Province, and if the development suggested takes place, there will be established an important additional market for the output of the coal mines of Vancouver Island, Merritt and Princeton.

Delayed Settlements Cause Closing Down of Mine.

Supt. W. G. Norrie-Loewenthal, of the Silver-Standard Mine, in announcing the temporary closing down of his mine, says:

"Our reason for closing down the mine and the mill at this time is purely one of freight rates and the value of Silver Standard ore and concentrates. The railways, chiefly on the American side, where the zinc is shipped, have been altering their rates to such an extent that the smelter people are unable to make a settlement until the rates are adjusted. The matter has been up for two or three months, the Silver Standard people hoping all the time that the rates would be satisfactorily adjusted, and operations continued at the mine. As yet nothing has been accomplished, and it may take another two or three months.

"The position of the Silver Standard is very simple. They have not yet received a dollar for all the zinc concentrates sent to the smelter on the other side, and no chance of getting any until the rates are adjusted, either for what has been shipped or for what is on hand. To continue operations under the circumstances is out of the question.

"As for the mine itself it never was in better shape. There are several shoots of very fine high grade ore recently opened up. Work at both the mine and the mill has been running very satisfactorily. There are on hand a hundred tons of zinc concentrates and 72 tons of lead concentrates."

Mr. R. H. Stewart Will Adjust Taxes.

R. H. Stewart, M.E., of Vancouver, has been appointed by the Provincial Government for the purpose of adjusting the income tax to which the mining companies operating in British Columbia are subjected. He will review the companies' balance sheets from a technical point of view and it is expected that, with his mature experience of operating, he will be able to arrive at equitable settlements in every instance.

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Mines Shipping Ore to Trail.

The two mines shipping the largest quantities of ore to the Consolidated Mining & Smelting Co's plant at Trail, B. C., during the past year up to the end of November were the War Eagle-Centre Star-Le Roi group at Rossland and the Sullivan mine, owned by the company. The former's total was 88,934 tons, the values being mainly in gold, and the latter's 88,836 tons, of which 82,742 tons supplied the zinc plant of the smelter. Other large shippers were the Emma Mine at Eholt, also owned by the company; the Josie Mine at Rossland with 17,114 tons, No. 1 Mine at Ainsworth, the largest shipper of silver-lead ore outside of the Sullivan with 5,782 tons, the Standard Silver Lead Mining Company at Silverton with 5,658 tons and the Bluebell at Ainsworth with 5,319 tons. There were some shippers from outside the Province among them being the Mandy Mine of Manitoba, which shipped 5,711 tons of high grade copper ore, the Electric Point in Washington which sent 4,563 tons of silver-lead ore, the San Poil at Republic which sent 2,615 tons of siliceous gold ore and the United Copper at Chewelah, which shipped 2,615 tons. Ore receipts at Trail from the various districts of British Columbia are as follows: Rossland, 107,457 tons; East Kootenay, 93,563 tons; Slocan and Ainsworth, 29,303 tons; Boundaty, 19,787 tons; Nelson, 4,246 tons; and American mines, 12,962 tons.

Conditions in Rossland.

Conditions are materially improving in Rossland, one of the most important of the mining centres of British Columbia. This is due to the resumption of operations on a large scale of the mines of the Consolidated Mining & Smelting Company. These are the largest gold producers of the province, their output under normal conditions being three-fifths of the gold produced by British Columbia.

PROVINCE OF ONTARIO
DEPARTMENT OF LANDS FORESTS & MINES
BUREAU OF MINES

Ontario's Mining Lands

Ontario, with its 407,262 square miles of area contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent. of the rocks being of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Helen, Magpie and Moose Mountain mines.

Many other useful minerals, both metallic and non-metallic, are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluorspar, graphite, gypsum, iron pyrites, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt and talc.

Building materials, such as marble, limestone, sandstone, granite, trap, sand and gravel, meet every demand. Lime, Portland cement, brick and tile are manufactured in quantity within the Province.

Ontario in 1917 produced 46 per cent. of the total mineral output of Canada. Returns made to the Ontario Bureau of Mines show the output of the mines and metallurgical works of the Province for the year 1917 to be worth $72,093,832, of which the metallic production was $56,831,857.

Dividends and bonuses paid to the end of 1917 amounted to $11,486,167.45 for gold mining companies, and $70,821,829.34 for silver mining companies, or a total of $82,307,996.79.

The prospector can go almost anywhere in the mineral regions in his canoe; the climate is invigorating and healthy, and there is plenty of wood and good water. A miner's license costs $5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 240 days' assessment work on a claim, patent may be obtained from the Crown on payment of $2.50 or $3.00 per acre, depending on location in surveyed or unsurveyed territory.

For list of publications, illustrated reports, geological maps and mining laws, apply to

G. H. FERGUSON,
MINISTER OF LANDS, FORESTS AND MINES,
Toronto, Canada

PROVINCE OF QUEBEC

MINES BRANCH

Department of Colonization, Mines and Fisheries

The chief minerals of the Province of Quebec are Asbestos, Chromite, Copper, Iron, Gold, Molybdenite, Phosphate, Mica, Graphite, Ornamental and Building Stone, Clays, etc.

The Mining Law gives absolute security of Title and is very favourable to the Prospector.

MINERS' CERTIFICATES. First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is $10.00, and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

SIX MONTHS AFTER STAKING. At the expiration of six months from the date of the staking, the prospector, to retain his rights, must take out a mining license.

MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of $10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

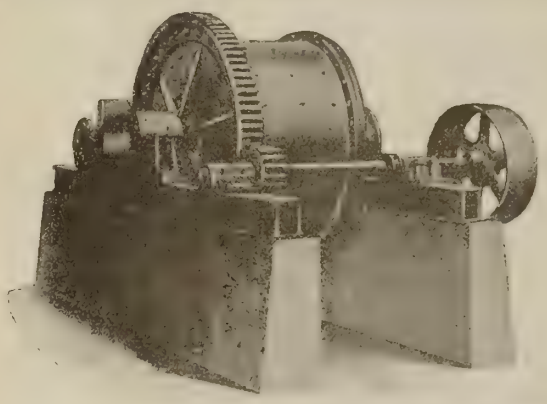
MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of $5 an acre for SUPERIOR METALS, and $3 an acre for INFERIOR MINERALS

The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized beltsare known to exist.

PROVINCIAL LABORATORY. Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY, 228 ST. DENIS STREET, MONTREAL, for the determination, assays and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

HONOURABLE HONORE MERCIER,
MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC.



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EDITORIAL

GRANTING MONOPOLY BY ORDER-IN-COUNCIL.

According to a story emanating from Ottawa, and reaching Toronto by way of Winnipeg and the "Manitoba Free Press," the Dominion Cabinet has had under serious consideration a proposal to grant a monopoly to the Shell Transport and Trading Company, Ltd., to enter upon and develop all the oil-bearing lands in Canada lying in the Province of Aberta. It is announced that a decision by the Cabinet is expected to be reached shortly.

The granting of a monopoly of such a sort to any group of men is itself open to objection. But there is a more serious aspect of the matter. Is it in keeping with democratic ideals that matters of this sort should be dealt with in such a secretive way?

There has been no public discussion as to the merits of this proposal. The Canadian Mining Institute has not yet been asked for its opinion on it. Is it possible that our readers are satisfied to accept the statement of the irresponsible; but evidently inspired writer that "a decision one way or the other may be expected at an early date." Who is responsible for this statement? Where did the Ottawa correspondent of The Free Press get his information? Why do Canadians permit anyone at Ottawa to be in a position to give out such information? Who is attempting to use the Cabinet as an instrument for obtaining special privileges? Why does the Press accept the story as a reasonable one?

The way in which the obviously inspired story has been accepted is an acknowledgement that it is quite possible that such an important matter could be decided by a duly influenced Cabinet and that by an Order-in-Council the decision could be put into effect. This is no time for secrecy in Government actions affecting the development of our country. The Government, if it is seriously considering granting the proposed monopoly, will do well to avoid secrecy.

THE MINING INDUSTRY AND THE WAR.

As a first test as to the value of our mining industry, one may well ask: "Did it help us to win the war?" That it did so will be evident when we consider that we contributed coal, iron, steel, nickel, copper, lead, zinc, aluminum, molybdenite, arsenic, chromite, asbestos, graphite, magnesite, pyrites and many other minerals. Our coal helped to produce power for manufacture of munitions and to propel ships that carried men and munitions across the Atlantic. Our iron and steel was made into millions of shells as well as into countless other forms of war articles. Our nickel was a very important factor during the war, for we produce four-fifths of the world's nickel, which is so greatly in demand for the manufacture of nickel-steel and nickel-chromium-steel. In a smaller way the other minerals and metals mentioned did their part.

It is well to enquire as to the source of these materials, and to consider whether we did as well as we should have done in the great emergency. The matter of coal supply is important to all our citizens. Why is there a shortage? Why has production in Nova Scotia fallen off. Why have the great coal deposits of western Alberta not been more generally utilized in the Prairie Provinces? The coal shortage affects almost everyone, and has helped to direct attention to the fact that we must have coal in war as in peace. When the calls for volunteers came in 1914 and 1915 the enlistment from our coal mining centres was exceptionally heavy. In Nova Scotia there was a rapid decline in number of miners available, and it has been and still is impossible to obtain men with the necessary experience to replace those who went to Belgium and France and fought so valiantly there. In Alberta the situation was quite different. There the mines were equipped and manned for a much larger output than the market demanded. The encouragement by the railways of the shipment of anthracite from the far eastern Pennsylvania fields, made it difficult for Western coal producers to compete in their natural market. When the anthracite supply was cut off there was soon an increase in output of Western coal. In Ontario there was more real danger of shortage, for here we are dependent almost entirely on imports from the United States. It is probable that we will continue to be so dependent. To balance such imports we should endeavor to export more coal from our Eastern and Western coal fields. The high cost of production may, however, make export trade practically impossible. In all parts of the country we should give more attention to the development of water powers for power purposes.

According to the Department of Mines, the total value of the mineral production in Canada during 1918 was probably not less than $220,000,000. The total value of the production in 1917 was $189,646,821. The Department of Mines estimates the production of coal during 1918 at about 15,180,000 short tons, as compared with a production of 14,046,759 short tons during 1917.

The production of the more important metals during

1918 is estimated as follows, viz.: Gold $14,750,000 in value; silver 20,800,000 ounces; copper 117,000,000 pounds; nickel 91,500,000 pounds; Zinc 36,000,000 pounds; pig iron 1,182,000 short tons; steel ingots and castings 1,910,000 short tons. The production of these metals in 1917 was: Gold $15,272,992 in value; silver 22,221,276 ounces; copper 109,227,332 pounds; nickel 82,330,280 pounds; Zinc 29,668,764 pounds; lead 32,576,281 pounds; pig iron 1,170,480 short tons; steel ingots and castings 1,745,734 short tons.

Our large output of iron and steel is not so satisfactory as the statistical tables indicate, for about 90 per cent of this iron was recovered from the treatment of foreign ore. The great iron and steel works of Nova Scotia draw their iron ore from Newfoundland. Most of the iron ore that goes into the furnaces in Central Canada comes from the Lake Superior States. We have deposits in Canada that will yield large quantities of iron ore; but it cannot be said that progress in iron ore mining is satisfactory. It seems probable that in the best interests of the country there will have to be more Government encouragement of the iron industry. The problem will be easily solved if rich large deposits are found, but to develop those that are known, in competition with the richer and more easily worked deposits of the Lake Superior States, is an enterprise that has not proven very alluring to capital.

In the case of nickel we are in a stronger position than any other country. The great mining industry of the Sudbury district are an asset that is hardly appreciated by Canadians. It is well known that the two producing companies are making a large profit on their operations; but there seems to be little recognition of the importance of the industry to the community. It is well to remember that the men employed in the mines and smelting works of the Sudbury district number about 5,000 men. The wages paid annually total over 5,000,000. Machinery and supplies purchased by the companies have cost many millions. In spite of the necessary heavy expenditures, however, the profits have in recent years been very large, and it was not surprising that the company has been called upon to set aside large sums for war taxes.

In Quebec the asbestos mining industry is flourishing, the demand in recent years being exceptionally good. Quebec is the world's chief source of asbestos, and consequently is benefitting by the numerous new uses which are being found for this heat resisting material. The backbone of Quebec mineral production during the war, as pointed out by Mr. Theo. C. Denis, is formed by non-metallic substances—asbestos, mica, magnesite, pyrites for sulphuric acid, and a very varied assortment of structural materials. The prominent part which the latter plays in the mineral production of the province is indicated by the fact that in pre-war times (in 1913) in a total value of a little over $13,000,000 the building materials accounted for 62 per cent, the metallic substance for 3½ per cent, only, the balance (34½ per cent) being made up of non-metallic minerals, such as asbestos, mica, graphite, magnesite. The effect of the war on our mining industry has been most marked, for in 1917 and 1918 the above proportions were greatly altered, and they now stand about as follows: Building materials, 33 per cent; metallic ores, 12 per cent; non-metallic minerals, 55 per cent; the total production of all of which amounted to $16,266,000 in 1917. Figures for 1918 are not yet available, but it is likely that the total value will exceed 17 million dollars.

Great progress is expected to be made this year in the now well established gold mining industry of Northern Ontario. There has been a great demand for gold during the war; but the selling price did not rise with the cost of production, and conditions were becoming such that few gold mines could be profitably operated. In spite of the difficulties encountered, however, progress was made during the war, and a great expansion will soon be possible. There can be little doubt that, for many years gold mines of Northern Ontario will pour out millions of new wealth. Big gold mines employ many men and represent very large investments for plant and development work. The dividends paid do not tell the whole story. Millions are spent annually for labor, supplies, machinery, etc. Around the mines a new community grows and makes a new market for farmers and merchants. Eventually the development of the mines is followed by agricultural development of the surrounding country. Some of the mines will be doubtless worked profitably for many years, and when their end comes the country will have been well tested by settlers who have had unusual transportation facilities and a close market provided by the mining industry. Mines, like railroads, are responsible for much of the agricultural development of our country. It is fortunate for the country that our gold mines lived through the war. The life of the chief producers was not thought to be in danger; but there was every possibility of their being seriously crippled if conditions had become worse instead of better.

One of the most active companies operating in British Columbia is the Consolidated Mining & Smelting Company of Canada. This company is a big producer of gold, copper, lead and zinc. It operates the smelter at Trail. When war broke out the company was not refining its zinc. The company during the war established zinc refining on a large scale, and is also refining some copper. In the face of many difficulties a big plant was built and put into operation. The company thus assisted in overcoming the situation which had been brought about by German control of the zinc market.

Notable progress was made during the war in developing molybdenite, magnesite and chromite deposits in Quebec. As a result we have now the greatest molybdenite mine in America, where when the war started was only an undeveloped prospect. A magnesite industry has been established and a market found for a

considerable quantity of chromite. Great progress has been made in processes of treating these three minerals. We may properly attribute most of this progress to the demand created by the war.

Throughout Canada the war demands stimulated activity in the development of certain minerals. We have little doubt that this stimulation will have permanently good effects.

STATE ADMINISTRATION OF NATURAL RESOURCES.

The question of the rights of the State with reference to the resources within its boundaries has seldom been clearly defined; and in actual practice the legislative control exercised by the State varies widely in the civilized communities of the world. For the sake of simplicity, let us discuss an ideal case, where a state, hitherto unpopulated, but endowed with rich resources, is thrown open to immigrants sufficiently numerous to populate the country and develop its varied resources. Let us suppose also that the outside world clamoured for admission into this new land. It will be granted without much argument that the wise policy for the authorities of such a state to adopt, in order to promote the best interests of the state as a whole, and of the future generations in particular, would be to declare all resources to be the inalienable property of the state, to be leased, under certain restrictions, to individuals or corporations. Under such a system the authorities would always be in a position to exercise supervision over the corporate wealth of the community. They would conserve where necessary in order that the population yet to come would not suffer from the faults of their predecessors. They would prevent exploitation by the promoter with the resources as a pawn in the great game of chance. Such a community would be guided by the principle that the natural resources are, and must always remain, the property of the people as a whole, and not of any individual member of the community; that private initiative and private capital should be given free scope under a long-lease tenure, thereby eliminating the valid objections which may be urged to any system of government operation; that, in order to preserve the rights of the community at large, all such leases should be granted subject to certain conditions of operation, in order on the one hand to ensure satisfactory production, and on the other hand to prevent waste. Such would no doubt be the position taken by any government which had to deal with the situation that we have outlined. And even under present conditions, were enormous resources, such as, for instance, the copper deposits of the Coppermine and neighboring territory in the Arctic Zone, discovered within easy reach of transportation, it is more than probable that the force of public opinion would compel the government, rather than even lease to private corporations, to operate the bonanza directly for the benefit of all the people.

The history of the growth of state communities has, however, been very different from the hyothetical case which we have outlined. Pioneer conditions are hard. Inducements must be offered in order to attract the best type of settler. At the early stage initiative and enterprise are essential, and these qualities are best displayed by the private individual and corporation. In the normal case the agricultural settler is the most desirable immigrant, and there is a deep-rooted desire in the human heart to possess the land on which the seed is sown and the harvest is reaped. For this and other reasons, the door is thrown wide open. Land is sold, given away, or alienated after certain conditions have been fulfilled. Other resources, such as timber, minerals, and even water powers, are handed over in toto; and a state may find itself after a lapse of a few centuries in a position where its revenue depends entirely on the indirect wealth which accumulates through the growth of commerce, and on the taxes collected on the production from resources in the development of which it has lost all control. This is a position to which not a few countries have been reduced; and there is undoubtedly a strong movement to-day towards a return to a general leasing system of natural resources, including even the land itself. Just as in the case of the private industrial corporation, the final bridging of the ever-widening gap between capital and labor may be formed by a carefully administered profit-sharing system, so in the case of the greatest industrial corporation—the state—the people may demand that they shall be more directly than heretofore participants in the profits accruing from the development of the natural wealth of the country in which they live and labor.—R. C. W.

While we have good reason for stating that the mining industry is well established in Canada; that production is increasing steadily and capable men are in charge of most of the operations, we should not be satisfied with the progress we are making. Our mineral resources become valuable only when they are used. Undiscovered ore is of no value, and undeveloped deposits are of little value. We should endeavor to speed up the work of the prospector and assist those who undertake the developing of properties in new districts. Only by the expenditure of labor and capital do mineral deposits become of use. For one prospect that becomes a profitable mine there are many that prove worthless. Those who provide funds for development work recognize that they run a good chance of losing their money. The experienced operators do not expect that many of their ventures will be profitable. They have a right, however, to expect that their successful ventures should prove very profitable. It is the hope of winning one of the rich prizes that leads men to seek mineral wealth in the wilderness. The whole country benefits from their work. It is in the interests of Canadians that development of our mineral resources be speeded up, that prospectors should be encouraged, that the Mines Departments should be authorized to extend their work. More attention should be given by farmers and manufacturers to this matter, with the view to obtaining a larger market in Canada for their products.

Important producing mines of the Slocan District (B. C.), during the past year were the Queen Bess with 2,300 tons and the Galena Farm at Silverton with 1,079 tons.

Coniagas Mine Has Produced Over 26,000,000 oz. Silver

President R. W. Leonard, said in his address at the annual meeting of Coniagas Mines, Ltd.:

During the year ended October 31st, 1918, your mine at Cobalt and your Smelter and Refinery at Thorold (The Coniagas Reduction Co., Ltd.), have been operated continuously and satisfactorily, having in view the difficulties incident to the limited supply of labor and the high cost of materials, which have materially increased the unit costs of your Companies' products. The decreased output and the increase in cost of production have been only partially offset by the enhanced prices received for your products. The average price realized by The Coniagas Mines, Ltd., for Silver sold during the year, was 94.14 cents per ounce, as compared with 79.89 cents per ounce in 1917, and 63.11 cents in 1916.

The output of silver from the mine during the year was 974,264 ounces, as compared with 1,344,267 ounces during the preceding year; and the combined sales of ore from your Mine and the products of your Reduction Company aggregated $4,099,490.

No new discoveries of ore of importance have been made at the Cobalt property, and the future output of the mine depends more than ever on the low-grade ore concentrated in the Mill than on the high-grade ore sacked in the mine. The extent of this low-grade ore is very difficult to determine, but the estimates of Mr. F. D. Reid, Mine Manager, would indicate that a further three years' supply is available, assuming a continuance of present market conditions.

The Coniagas Reduction Company shipped during the year 2,390,737 ounces of Silver, much of which had been taken in at the lower prices prevailing during preceding years, and there are at present over 1,000,000 ounces in process of reduction.

The total shipments of silver from the property to October 31st, 1918, aggregate over 26,000,000 ounces.

The ore has been mined and concentrated during the past year at a net cost of 33.87 cents per ounce, as compared with 21.36 cents per ounce during the previous year. This cost includes all overhead expenses, royalties and other general expenses, but excludes cost of smelting, refining, shipping and marketing, which amount to 7.98 cents per ounce, as compared with 4.31 cents per ounce for the preceding year; and includes a War Profits Tax estimated at $25,332.54. The average cost per ounce of Silver produced during the past 12 years, including all charges above mentioned, has been 16.306 cents.

During the year the following Dividends, amounting to 7½%, were paid:

No. 39—Feb. 2nd, 1918, 2½% $100,000.00
No. 40—May 1st, 1918, 2½% 100,000.00
No. 41—Aug. 1st, 1918, 2½% 100,000.00

and a Dividend of 2½%, with a bonus of 2½%, was declared, payable on Nov. 1st, 1918. These disbursements make a total distribution to the Shareholders to date of $9,240,000.00, of which $7,200,000.00, or 180% of Capital, was paid as Dividends, and $2,040,000.00, or 51%, as Bonuses.

Up to the present time no royalties have been paid to the Minerals Separation Corporation for flotation concentration patents. This Corporation, which claims ownership of these patents, is under investigation by the United States Federal Trade Commission to determine whether they are conducting their operations in the United States on a fair basis.

After making a payment of $30,000 in April last for extension of the option on the Ankerite gold property at South Porcupine, requiring a further very substantial payment, your directors decided to drop the option on this property, but your company still owns three adjoining claims, comprising in all about 120 acres, carrying the extension of the Ankerite ore body.

The consolidation of the Wabi Iron Works, Ltd. (of which your Company owned 6,055 shares at a par value of $1.00), with the Electric Steel & Metals Co. of Welland, and the Boving Hydraulic & Engineering Co., Ltd., of Lindsay, has been effected under the Corporate name of Electric Steel & Engineering, Ltd., and in exchange for shares held in the Wabi Iron Works, Ltd., your company has received 137 shares of Preferred and 137 shares of common stock of a par value of $100, in the new company. A dividend of 3½% was received on the preferred shares on July 1st last.

In view of the substantial cash balance shown in the Financial Statement, your Directors, at a meeting held on October 7th, decided to subscribe, on behalf of the company, for $615,000 of Canadian Victory Loan Bonds, which were purchased in November, making your total holdings of that security $700,000.

Superintendent Fraser D. Reid, in his report, says:

During the year an average of 108 men were employed. The mill ran 93.36 per cent. of possible time.

The tonnage of ore milled was 68,597.0 tons, or an average of 3.38 tons a stamp for 24 hours, as compared with 60,928.8, averaging 3.07 tons per stamp for the previous year. There were 529.51 tons, dry weight, of High Grade Concentrates shipped, and 866.77 tons, dry weight, of Low Grade Slime Concentrates, the former averaging 1164.10 ounces per ton and the latter 244.81 ounces per ton. Mill heads for the year averaged 15.94 ounces per ton as compared with 18.56 ounces per ton for the previous year.

The Cyanide Plant, which had been operating solely on canvas table concentrates and primary mine slime, was shut down on November 20th, 1917. Such action was necessitated by the fact that the vancas tables had been discarded and the Callow Flotation Process had been installed.

The Callow Flotation Plant, to which another unit was added during the year, treated all tailings from the concentrating mill, affecting a material recovery there from. The assay of final tailing, in ounces per ton, was 1.75, as compared with 2.98 ounces for the previous year.

Re-treatment of the sand tailings pile was begun in May, and continued satisfactorily until November, when further operations were curtailed by the non-delivery of machinery necessary to carry on operations during the winter. During this time 21,886.9 tons were treated.

There still remains, stacked on the property, 155,113

tons of sand, tailing of an average value of 3.5 ounces to the ton, and 40,000 tons of slime tailing of an average value of 6.0 ounces to the ton. The total value of sand and slime tailings, in ounces of silver, is 782,895.5.

Development work during the year has been confined to the following of small veins and stringers on all levels and driving numerous crosscuts through unexplored areas.

This work has developed a large tonnage of low grade milling ore. The broken rock on stulls in the mine has been increased 13,825 tons.

A total of 63.22 tons, dry weight, of high grade mine ore, was shipped, which averaged 2,303.7 ounces per ton.

The Coniagas Mines, Limited, was incorporated November, 1906; concentration of ore began September 24th, 1907; mine ore and concentrates shipped and treated together during 1907 and 1908.

Work done to date and work done during the year ending October 31st, 1918:

	Total to Octo. 31st, 1918.	Total to Oct. 31st, 1917.	Work done during 1917-1918
Shaft Sinking, Feet	879	879	....
Drifting, Feet	19,909	18,834	1,075
Crosscutting, Feet	10,678	10,295	383
Winzing, Feet	721	632	89
Raising, Feet	1,538	1,396	142
	33,725	32,036	1,689

	Tons removed since beginning of operations to Oct. 31, 1918.	Tons removed to Oct. 31, 1917.	Tons removed during 1917-18.
Crosscutting	52,124.1	51,624.0	500.1 Waste
Drifting	64.357.5	61,670.0	2,687.5 Ore
Stoping	470,556.5	404,655.0	65,901.5 Ore
Open Cutting	4,880.0	4,880.0	
Winzing and Raising	7,209.9	6,916.0	293.9 Waste
Shaft Sinking	2,955.0	2,955.0	
	602,083.0	632,700.0	69,383.0

Ore Milled in Tons to October 31st, 1918.

Total to Oct. 31st, 1918.	Total to Oct. 31st, 1917.	Milled during 1917-18.
524,062	455,465	68,579

There is sufficient broken rock on the stulls in the mine to keep the mill in operation at present capacity for over a year without breaking any new ore.

Total Shipments from the Coniagas Mine.

Year, Nov. 1 To Oct. 31.	Mine Ore		Concentrates.		Total	
	Tons	Ounces	Tons.	Ounces.	Tons.	Ounces.
1905-06	289.0	657,513	.....	.....	289.0	657,513
1906-07	2,655.0	1,341,372	.....	.....	2,655.0	1,341,372
1907-08	Mine Ore and Concentrates				627.5	1,457,240
1908-09	350.0	807.313	426.0	599,975	776.0	1,407,288
1909-10	330.1	979,630	645.5	949,901	975.6	1,929,531
1910-11	619.1	2,142.961	1.418.4	1,646,312	2,037.5	3,789,273
1911-12	650.0	1,944,212	1,287.5	1,564,164	1,937.5	3,508,377
1912-13	735.8	2,249,394	1,034.3	1,323,004	1,770.1	3,572,398
1913-14	492.9	1,451,522	748.2	1,045,872	1,241.1	2,497,394
1914-15	274.0	940,432	629.7	1,061,620	903.7	2,002,053
1915-16	193,2	522,908	647.9	1,250,378	841.1	1,773,286
1916-17	124.3	391,964	742.4	952,303	866.7	1,344,267
1917-18	63.2	145,642	1,396.3	828,621	1,459.5	974,264
	6,776.6	13,574,866	8,976.2	11,222,153	16,380.3	26,254,260

Shot Drilling Around Thetford Mines

By J. W. DAVIS.*

Increased activity in mining around Thetford and Coleraine, Quebec, has resulted in considerable prospecting work in asbestos and chromite iron deposits in which Calyx Shot Drills are being used extensively with very satisfactory results.

The formation in this whole district is fractured serpentine and granite, some of the latter being so hard that it will cut glass. The slips run in all directions, and the majority may be described as high angle fractures.

Cut No. 1 illustrates an average core and shows the irregular nature of the seams. Cores taken at several points within a radius of fifteen miles of Thetford have all been drilled in the same broken formation so that it is possible to accurately predict the drilling speed and cost for holes of the same depth, although where granite is not encountered the drilling is faster and the cost lower. However, few holes have been drilled that have entirely missed the granite which is in seams from 1 to 15 feet thick.

The Calyx Drill can use any size bit necessary and by taking out a large core is able to penetrate broken ground and to recover a very large percentage of the material drilled. At Coleraine a total of 209′ of core was recovered from a hole 212′ deep. The ability of the Calyx Drill to extract asbestos cores without losing the fibre is a very important consideration as it is only by visual examination that the extent of the deposit may be determined.

Cut No. 2 illustrates a core in which the vein of crude has not been disturbed. With the diamond drill it was found practically impossible to obtain a core in disseminated chrome ore which is so soft that the core almost invariably crumbled whereas the Calyx Drill takes out perfect cores with a percentage of recovery hitherto unknown. The results have caused a revival in this particular method of prospecting which had been practically abandoned in Thetford and adjacent camps.

Cut No. 3 illustrates a chrome core in which the chromite is plainly visible.

The first shot drilling in the district was done about three miles back of East Broughton with the object of testing out a deposit of Chalco-pyrite in a schist formation. 3″ tools were used taking out a 2″ core but these proved too small as the ground was very badly broken, the core largely consisting of a continuous series of thin discs about an inch thick, which however were recovered. At a depth of about 90 feet the ground be-

*District Sales Manager, Canadian Ingersoll Rand Co., Limited.

came so fractured that the hole finally caved in and the tools were extracted with considerable difficulty. A set of 4½" tools was substituted, the core being 3⅜" diameter and a new hole penetrated the same material making a full recovery without further trouble. In this way 4½" tools were adopted as most suitable for the formation and have since been used on all shot drills in the district. It was demonstrated that in solid rock the large tools did not drill appreciably slower than smaller ones while in fractured material they were essential and satisfactory.

The present high prices and the demand for asbestos and chromite are mainly responsible for the increased activity in shot drilling but several other factors have contributed. Some of the present pits are very deep and hoisting is becoming increasingly difficult and dangerous. In consequence the neighboring ground is being prospected with a view to opening new surface workings. To do away with the present system of cableways and also to enable the miners to work in bad weather underground workings are being opened up on some of the properties and this ground is being thoroughly prospected to determine the location of the best ore and the proper position for main hoisting shafts.

Shot drilling is still being done on half a dozen properties and better records are being made as the operators become more familiar with the formation. However, the following tables and notes are representative of the work done during 1917 and it is our intention to collect further data which will be incorporated into a second article at a later date. All costs cover complete operating charges including moving of drill but do not include interest on investment or depreciation:—

Bennett-Martin Asbestos & Chrome Mines Ltd., Coleraine, Que.

BOREHOLE NO. 1.

Depth, feet	212
Diameter core	3⅜"
Diameter hole	4¾"
Angle, from vertical	15°
Working hours	190
Running hours	185
Greatest footage in one shift	18′ 3"
Average footage per shift	11′ 1"

COST

Labor (including board)	$149.15
Gasoline	30.00
Oil	3.75
Shot	11.10
Bit wear	6.50
Total cost	$200.50
Cost per foot	.94

Jacobs Asbestos Mining Co., Thetford Mines, Que.

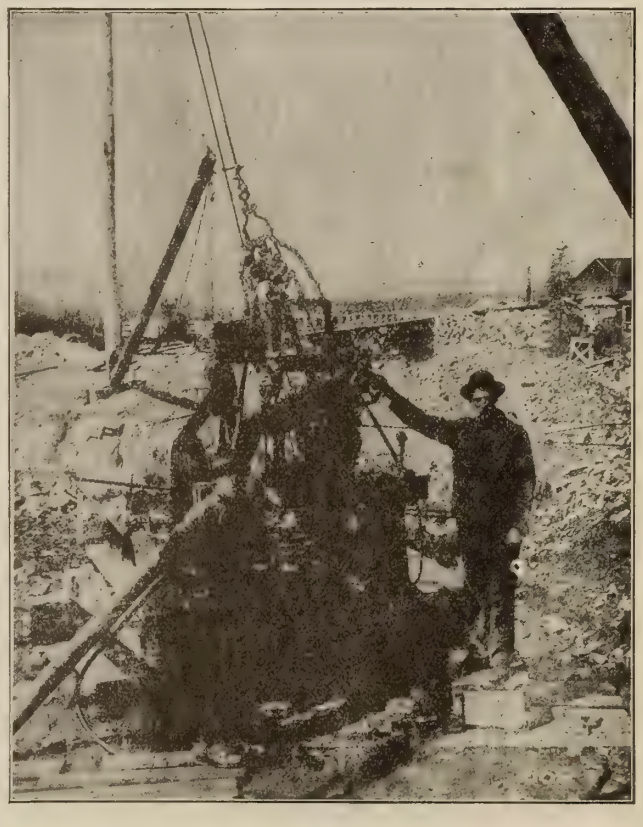
BOREHOLE NO. 1.

Depth, feet	356
Diameter core	3⅜"
Diameter hole	4¾"
Vertical hole	
Working hours	380
Running hours	339
Greatest footage in one shift	16′ 0"
Average footage per shift	9.66′
Average footage per running hour	1 foot

COST

Labor (including board)	$434.90
Gasoline	41.50
Oil	5.90
Supplies	3.00
Shot	20.00
Bit wear	13.00
Total cost	$518.30
Cost per foot	1.45

During 21 shifts average drilling speed was 11



Mutual Chemical Co., Black Lake, P. Q.

3⅜" Core.
4¾" Hole.

All Angle Holes.

Hole No.	Depth Feet	Working Hours	Drilling Hours	Greatest Footage Per Shift	Shot Pounds Used	Core Feet Recovered	Times Pulled Rods	Footage Per Hour Working	Footage Per Hour Drilling
5	121	140	96	17′-4"	126	80	72	.858	1.26
6	151	180	126	14	173	118	62	.824	1.20
7	146	152	109	16	135	102	46	.85	1.33
8	144	174	103	16	125	119	48	.93	1.38
9	128	147	99	16	125	100	47	.85	1.33
10	128	120	98	16	110	103	47	1.08	1.34
11	92	97	71	14	98	70	28	.95	1.30

Average cost, including moving of drill was $1.28 per foot and excluding moving $1.14, 12 shots bits were used in drilling a total of 1,426 feet at an average bit wear cost of .0791 per foot. It was found advisable to keep a number of bits on the job and to square off the ends daily.

At the present time shot drilling is being done by the following operators in the Thetford Camp:

Asbestos Corporation of Canada, Beaver Mine, Thetford Mines, P. Q., Federal Asbestos Company, Robertson, Que., Quebec Asbestos & Chrome Mines, St. Cyr, Quebec, Dominion Mines and Quarries, Black Lake, Que.

Carefully tabulated costs are being kept on all this work and will be published at a later date.

THE IMPERIAL OIL CO.'S INDUSTRIAL RELATIONSHIP PLAN.

Hon. W. J. Hanna Outlines the Scheme.

The spirit which found its noblest expression in the brotherhood of the battlefield has outlived the conflict. It is taking its dominant place in the endeavors of peace. Addressing the gathering of officers and employes of the Imperial Oil Company—the oldest refinery in Canada and the largest in the British Empire—at Sarnia, Hon. W. J. Hanna, the president, outlined the new "industrial relationship plan" which the company has adopted. It was inspired, he frankly stated, by "the lesson of the brotherhood of the battlefield."

"We are feeling our way," said Mr. Hanna, "toward an organization of industry which will reflect and express its essential partnership—which will restore to us the personal touch which, to some extent at least, we lost in what we call our industrial era."

Fifty employes' representatives, elected by ballot by the five thousand men at the works, met the officers of the company with a view to developing greater co-operation and camaraderie, and to discuss the industrial relationship plan, which provides for adjustment of all matters of wages, hours, etc. Mr. Hanna outlined it in his address as follows:

"The agreement governing this new relationship between the company and its employes which is submitted to you provides for conferences between employes' regularly-elected representatives and representatives of the company on the subject of wage adjustments, hours and all matters of mutual interest. It gives to every employe who believes himself to be suffering from unjust treatment or unfair conditions, access through his elected representative to the general superintendent and higher officials of the company, and the right of a conference upon his grievance. It insures the continuance of the policy which has always protected the employe from discrimination on account of membership or non-membership in any church, society, fraternity or union, and it provides other conditions between the company and ourselves which will, we hope, continue and strengthen the harmonious relations which have always existed.

"Our motive in establishing the labor relationship plan with its benefits to employes is not based on philanthropy. We know you better than to suggest philanthropy to you. This plan is purely a policy of business administration to promote continuity of effect and permanence of employment, to the end that replacement changes, one of the most serious menaces to the prosperity of capital and labor alike, is reduced to a minimum.

"On the first day of January we propose that everyone who has served the company for twelve months shall become insured for an amount, depending, of course, on his years of service and his earnings, the minimum being $500 and the maximum $2,000.

"On February 1 we propose to establish old age pensions, so that when a man has reached the age of 65 he can retire, and on his retirement be assured of a reasonable amount to care for himself and family during the rest of his years.

"On the first of March we propose to establish a sick benefit plan by which we can properly care for our men when sickness overtakes them."

Mr. Hanna also announced that all employes who had served as soldiers would be reinstated in the service of the company at no reduction from their former wages or salaries, and adjustments made where necessary to meet the physical condition of any who had suffered disabilities.

Thirteen trades are represented upon the workingmen's committee elected by the thousand employes of the Imperial Oil Company's Sarnia refinery to inaugurate the industrial republic. The conference, at which an agreement was reached providing for the adjudication of matters of wages, hours, living conditions, and the rights of wage earners, marks the first practical application of an industrial relationship plan in any large industry in Canada, and by Jan. 1 it will be extended to cover five large refineries, many marketing stations throughout Canada, the company's fleet, and more than six thousand employes.

Since 1897, when it was incorporated, the company has had no labor troubles, and the agreement reached to-night by the unanimous vote of directors and employes was not in the nature of a truce, but of a treaty based upon 21 years of peace. Henceforth any employe who believes himself to be suffering from unjust treatment or unfair conditions will have the right of appeal to his workingmen's representative, and through him to the higher officials of the company.

The questions as to the remuneration and treatment of labor are to be determined by joint conferences of the company and employes' representatives, and it is provided that at these conferences the number of company representatives voting shall not exceed the number of workingmen representatives having the same right, except for certain specified offences, most of which represent violations of law. No employe is to be dismissed without the right of appeal to a conference for a review of his case, and the agreement sets forth that there is to be no discrimination against any employe on account of membership in any union, fraternity or other organization.—Hamilton Spectator.

MILLER INDEPENDENCE.

Boston Creek, January 2.

The by-law authorizing the increase of the capital of the Miller Independence Mines from 500,000 to 700,000 shares has been passed unanimously. Upwards of 400,000 of the 500,000 shares of the issued capital was represented at the meeting. W. E. Simpson, who, together with Frank Groch of Cobalt, is consulting engineer for the company, arrived here early this week for the purpose of thoroughly sampling the mine. It is planned to survey and sample the entire surface and underground workings. This work is preliminary to the actual beginning of the big development programme now proposed and for which the increase in capital has been authorized.

MINING IN CARIBOO DISTRICT.

Discussing the season's mining operations in the Cariboo District, B.C., Henry Boursin, a well-known mining man, makes the following statements:

"The output from the hydraulic mines this year was less than that of last year, owing to a shorter water season and scarcity of labor, although the clean-up of the Stout's Gulch Mine was more than usual, due to the discovery of another channel of pay gravel. Stout's Gulch is a small stream just above Barkerville, B.C. The yield of gold from the Gulch, first by drifting and later by hydraulic, amounts to $2,500,000. The width of hydraulic pay (more than 600 feet) is extraordinary for such a small stream.

"C. W. Moore, acting for American capitalists, has bought the locally owned Waverly Hydraulic Mine on Grouse Creek, four miles from Barkerville. Although the Waverly is one of the oldest hydraulic properties in the Province, it doubtless contains more gold than has been washed out of it, as the head of the sluice flume is 30 feet above the bottom of the pay gravel in the main channel, and the gravel below the flume is known to be rich.

"F. J. Tregillus, T. A. Blair and Pat Carey are sinking a shaft on the nine-foot gold-bearing vein on their Warspite Claim four miles from Barkerville. At the present depth, 14 feet, the shaft discloses an excellent showing of visible gold, while the rock in which no gold can be seen shows a nice string of flour-gold when mortared and panned. The vein on which this work is being done has been exposed at intervals by trenching, and open cuts a length of more than 8,000 feet, and is believed to be the motherlode from which the $20,000,000 placer of Williams Creek and the $2,500,000 placer of Grouse Creek have their origin.

"The creeks mentioned drain the western and eastern slopes respectively of the Proserpine Mountain, and the strike of the vein closely approximates the up-stream limit of rich placer on each creek.

"The Lightning Creek Gold Gravels company is drilling with a Keystone on Lightning at Wingdam. This company was promoted by C. H. Unverzaght, of New York, and last summer an agent of the United States Government was sent to the property to see how conditions tallied with advertisements.

THE GREENWOOD SMELTER PROBLEM.

The closing down of the Greenwood, B. C., Smelter by the Canada Copper Corporation has stirred the residents of that district to action. They do not propose allowing the plant to remain idle if anything they can do can prevent it. Hon. J. D. MacLean, Minister of Education in the Provincial Government and the member for the section particularly affected, visited his constituency recently and interviewed the management of the company to ascertain whether some arrangement could not be made for the re-opening of the smelter. His efforts, however, were without avail, although he is understood to have volunteered to use his influence with the Government to endeavor to obtain financial assistance. The citizens will not accept a negative, following up Dr. MacLean's unsuccessful intervention with a mass meeting in order to obtain the united financial and moral backing of residents. They appointed Mr. Oscar Lachmund, former manager of the Canada Copper Corporation, to take charge of negotiations with the company officials and advanced three alternative propositions. One is that a sufficient ore supply be sought to keep the plant in operation and the Canada Copper Corporation again be asked to continue. Another is for an independent company to lease the plant and pay royalty to the company for ore from their mines. The third is that the Town of Greenwood buy the smelter, build a lead stack, and operate with copper, lead and silver ores from both sides of the international boundary.

U. S. Mineral Output in 1918 Valued at $5,160,000,000

Preliminary estimates of the U. S. Geological Survey show that the output of metallic products, chief of which are pig iron, copper, ferro-alloys, lead, zinc, gold, silver, and aluminum, was valued at over $1,895,000,000 in 1918, against $2,091,825,000 in 1917, and that the non-metallic products, principal of which are coal, petroleum, clay products, cement, and natural gas, were valued at over $3,265,000,000 in 1918, against about $2,889,000,000 in 1917. The total for 1918, including unspecified products, is roughly estimated by the Survey at $5,160,000,000, a good increase over the total of nearly $5,011,000,000 for 1917, and a vast increase over $3,513,972,000 for 1916.

Copper.

The production of copper in the U. S. in 1918 was slightly larger than in 1917, according to preliminary figures and estimates collected by B. S. Butler, of the United States Geological Survey, Department of the Interior, from all plants that make blister copper from domestic ores or that produce refined copper. At an average price of about 24.75 cents a pound, the output for 1918 has a value of $473,000,000, as against values of $510,000,000 for 1917, and $190,000,000 for 1913.

Lead and Zinc.

The domestic mine output of lead and zinc decreased in 1918, according to C. E. Siebenthal, in a statement just issued by the U. S. Geological Survey, Department of the Interior. The lead and the recoverable zinc of ores mined was approximately 563,000 tons and 627,000 tons, as compared with 651,156 tons and 711,192 tons in 1917. The refined lead output of smelters and refineries was 645,000 tons, against 612,214 tons in 1917, and the antimonlia lead output was 22,000 tons, as against 18,647 tons. The lead available in the United States is 540,000 tons, against 515,258 tons in 1917. The output of spelter from domestic and foreign ore was 525,600 tons, compared with 669,573 tons in 1917. Spelter from foreign ore decreased to 23,300 tons from 84,976 tons in 1917. The apparent domestic consumption of spelter was 440,000 tons, compared with 413,984 tons in 1917. The consumption figures of both lead and zinc include the metal shipped abroad for use of the American Expeditionary Forces. The average price of lead at New York was 7.6 cents a pound, and of spelter at St. Louis, 8 cents a pound.

Oil.

The quantity of petroleum marketed from oil wells and field storage tanks in the United States in 1918 amounted to 345,500,000 barrels, an apparent gain of 3 per cent. over the former record output of 335,315,601 barrels, established in 1917. The output in 1918 includes no less than 6,500,000 barrels of crude oil removed from field storage during the year. The surface reserve of crude oil held by oil producers and pipe-line companies in the United States at the end of 1918 is estimated at 123,000,000 barrels, compared with 150,000,000 barrels at the end of 1917.

Special Correspondence

NORTHERN ONTARIO.

More Miners Now at Cobalt.

"Oceans of labor," such was the unhesitating reply of a leading mine manager in Cobalt recently when interviewed as to the labor situation in the Cobalt camp. In the Cobalt mines a shortage of ten per cent in the working forces of the various properties existed about two months ago, while to-day the supply of labor is satisfactory. With the price of silver high, the mines of the Cobalt district are producing silver at a good margin of profit from ore that recently as two years ago was unprofitable to handle. Thus the ore reserves of the producing mines have been added to a large extent and the life of the camp lengthened thereby. The present year promises to be one of exceptional prosperity for the silver mining industry, and Cobalt, which has occupied such an important place in the world's output of the white metal for a number of years, will retain a very high place in the list of districts producing silver. With the slackening of production in a number of the world's largest copper mines from which a good deal of silver has been produced, the demand for Cobalt's silver should increase. Thus, the outlook for the white metal during the current year is very bright and the Cobalt district will benefit greatly thereby.

Pittsburg-Lorrain Mine Closed Down.

The Pittsburg-Lorrain mine in the South Lorrain section of the Cobalt camp has closed down. The work at this property had been carried on consistently and aggressively by private interests of Pittsburg for the past two years with varying results, the operation representing a most earnest endeavor at mine making. The syndicate, in addition to owning and operating the old Currie property, also operated the mine and mill of the Wettlaufer Silver Mines under lease. All work was recently discontinued, after the shipment of two carloads of ore, from the property.

The Flotation Prices.

The Federal Trade Commission of the United States recently commenced proceedings against the Minerals Separation North American Corporation, which concern claims the patent rights to the oil flotation process for the treatment of ore. The charge is under the terms of its organic act, with the administration of a simple, just and inclusive pronouncement of laws—"Unfair methods of competition in commerce are hereby declared unlawful."

The action of the American Federal Trade Commission will give general satisfaction to mining companies using the oil flotation process in the Cobalt camp. The Minerals Separation Corporation has so framed its agreement or contract that mining companies would always have to pay a toll to it if the Federal Commission had not come to their rescue. It is hoped that the Commission will come to a just and conclusive decision, and that this process, by which 30,000,000 tons of ore annually are treated in Canada and the United States, will be properly governed.

Paragon-Hitchcock.

A narrow vein, carrying high silver values is reported to have been discovered on the Paragon-Hitchcock property at Elk Lake. The vein is about one inch in width and was encountered at the 100-foot level.

Device to Hold and Turn Steel.

Mr. Duncan McKinley, a miner of Elk Lake has secured a machine which is said to do work of one man in working with hand steel. The little machine, which is very compact, holds and turns the drill after each stroke, so that the hammerman is all that is required to drill with hand steel. A number of practical miners have tried the invention here and give it great praise.

Increasing Working Force at Adanac.

Owing to favorable developments at the Adanac mine it has been decided to add to the working forces at the property and also to increase the number of machines employed. This announcement was officially given out recently. During the past year the Adanac has been operated aggressively, something like 1,000 ft. of underground work being done. It was not until recent months that the work reached the point recommended by Alfred R. Whitman for extensive development. A crosscut has been run to the west of the long drift at the 310 ft. level of the property, during the course of which work a number of important developments took place a series of veins containing silver values being encountered. The main vein of this series has been drifted on for a considerable distance and a considerable amount of good grade ore has been developed. The decision of the company to increase the working forces at the mine, and the recent announcement that shipments would be made regularly to one of the customs mills of the camp, indicate that the operation of the property is meeting with a good deal of success.

McKinley Cuts New High Grade Silver Vein.

A new high grade vein was cut this week at the 300 ft. level of the McKinley-Darragh-Savage mines at Cobalt. The find was made in the western half of the property where a considerable area of virgin ground remains to be explored. So far several rounds of shots have been taken off the vein, which has been found to maintain a width of from one to two inches, some of the ore running as high as four thousand ounces to the ton, while the average grade is high. Besides the rich high grade streak the wall rock on either side is well shot through with leaf silver, and a considerable tonnage of low grade ore is being opened up. The finding of low grade ore in the wall rock at the McKinley is quite the usual occurrence. The low grade ore sometimes proves ultimately of more value and a more lasting source of revenue than the limited shoots of high grade.

A recent financial statement of the company showed its financial position to be fairly strong, aggregating $350,169, made up as follows: Cash on hand, $196,034; ore in transit and in smelter, $105,500; ore at the mine ready for shipment, $48,535. The McKinley-Darragh's new oil flotation mill has been working on sands and slimes from the bed of Cobalt lake for the past summer and has added to the revenue of the company about $8,000 per month from this source. This oil flotation mill has closed down for the winter, but operations will be resumed in the spring on an enlarged scale a new large pump being installed for the quicker handling of the material to the mill. While it is early yet to pass an opinion on the new vein cut in the western section of the property this week, the indications are that an orebody of considerable importance might be developed.

Crown Reserve's New Vein Shows Up Well.

The new rich vein recently discovered at the 200 ft. level of the Crown Reserve Mine continues to show up well under development. For a distance of one hundred feet the vein has shown a width of from about three inches on an average, and contains average silver values of about three thousand ounces to the ton. The vein occurs in conglomerate formation and the geological conditions are such as to point to the likelihood of the deposit being of extreme importance. A considerable amount of ore has already been opened up and will add considerably to the revenue of the company. One of the most important features in connection with the development on the eastern section of the property where the vein was encountered, is that the eastern section of the property is practically virgin territory, with favorable geological conditions existing. This fact presents big possibilities. The exact depth of the conglomerate formation has not yet been ascertained, but it has been proven to continue to at least a depth of 35 ft. below the 200 ft. level. The discovery of this vein, coupled with the further development of the ore shoot, marks the discovery as one of the most important recorded in the Cobalt camp in several months.

The annual meeting of the Crown Reserve Mining Company will be held in Montreal on the 22nd of the current month. The company owns a large amount of the stock of the Porcupine Crown Mines and no doubt some definite announcement of the further operation of this mine will be forthcoming at the meeting, and the recent developments at the company's Cobalt property should prove a source of much satisfaction to the shareholders.

Cobalt's Big Silver Producers.

The Nipissing, Mining Corporation of Canada and the Kerr Lake Mines were the leading producers of silver in the Cobalt camp during the past year. The year was not marked by any sensational developments, but rather a very high, consistent rate of production was maintained. The Nipissing and Mining Corporation of Canada produced somewhere around four million ounces each during the year, while the Kerr Lake produced around two and a half million ounces. The O'Brien Mining Company is the only other Cobalt producer which exceeded the million ounce production. The Coniagas mine, which has maintained a production of upwards of a million ounces for the past eleven years, this year fell below the million ounce mark by about twenty-four thousand ounces. The Nipissing with its large acreage of virgin ground has added a number of high grade silver veins to the large number previously known. A more or less comprehensive plan of development is now being carried out at this leading Cobalt property, in addition to which normal production is being maintained. This extension of development plans may reasonably be expected to result in the discovery of other important ore bodies. During the past year the Nipissing mine has taken the position formerly occupied by the Mining Corporation of Canada as the largest silver producer in the British Empire, and there is every reason to look forward to this enviable position being maintained by the company for many years to come.

Bailey-Cobalt.

The shareholders of the Bailey-Cobalt Mines are being asked to sanction the sale of the property to a new company known as the Bailey-Northern Customs, Limited, with a capitalization of one and a quarter million dollars. The proposed plan is that the liquidators sell to the new company the Bailey mine with all its assets for 425,000 shares of the stock in the new company, which will enable the liquidators to distribute one share of new stock for every ten shares of Bailey stock now held by the shareholders. The new company would then purchase the assets of the Northern Customs Concentrator Company which owns a large mill located in the Cobalt camp, which is understood to have cost upwards of $300,000 to erect. This mill at the present time is said to have contracts for treating ores from the LaRose Mines, Foster Mine, Right of Way and Green Meehan mine, and has other contracts under negotiation. The recent circular sent to the shareholders states that the mill is capable of earning $91,250 yearly from its custom mill operation alone. The new company, besides owning the Bailey mine and this large customs mill has made provision to have $50,000 in the treasury for working capital. The proposed plan also provides for the payment of all claims of the liquidators shall be settled and the new venture started out free of debt and with $50,000 in the treasury. As soon as the new proposal is ratified by the shareholders the new company propose to start work and commence mining operations.

Any solution of the troubles of the Bailey-Cobalt Mining Company will no doubt prove a source of gratification to the many shareholders who have long since ceased to think of the concern as a live issue owing to the long-drawn out litigation proceedings.

Want Government to Open Remainder of Gillies Limits.

The Ontario Government is to be asked in the near future to throw open the remainder of Gillies' Limits for mining purposes. The Boards of Trade of the North Country will perhaps be asked to co-operate with this end in view. A few years ago the section of the limits immediately adjoining the Cobalt camp were thrown open, but nothing of much importance has so far been discovered in this territory as the section thrown open did not include any of the area in which the conditions were favorable to the finding of silver deposits. If the restriction on Gillies' Limits could be removed, a large field would be open to prospectors, and the probability is that discoveries of much importance would be made. In the meantime those prospecting in the Limits would naturally make Cobalt or Haileybury their headquarters, and in various ways the increased activities would be beneficial to many towns in the North. It is anticipated that there will be a surplus of labor during the coming summer and early fall of 1919, and a large number of men would find profitable employment in the opening up and prospecting of this promising area which at the present time is being reserved for timbering purposes.

The Plenaurum.

Various opinions are expressed throughout the North country by mining men regarding the extension granted the McIntyre mining company of Porcupine on the Plenaurum property. It is stated that the reason for requesting an extension of time on this property, is the fact that it was physically impossible for the company to secure adequate working forces with which to carry out the proposed exploration program during the past year. While this is true, the extension of one year appears to have left the impression that nothing of big importance has so far been encountered on the property. The opinion in the camp appears to be that had the McIntyre opened up ore-

bodies of importance it would scarcely have been possible to secure an extension in view of the exceedingly reasonable terms governing the former option on which the present year's extension is based.

On the McIntyre mine itself, development work continues to be exceedingly favorable and the mine holders, unchallenged for the present, the enviable position of the second largest gold producing mine in the Dominion.

Porcupine Crown.

It is highly probable that the Porcupine Crown Mines will resume operations in the near future. The mine has been kept pumped out and the milling plant is in an excellent state of repair. Enough high grade ore for six months' operations is broken on the stulls in the mine ready for hoisting to the mill. The treasury of the company contains something like a quarter of a million dollars and, with scores of men coming to the Porcupine camp every week looking for employment, the time is considered opportune for the Porcupine Crown to soon commence operations at full blast. The ore reserves already blocked out at the property are sufficient to keep the mill operating at capacity for a period of two years. Previous to closing down, the company was on a dividend paying basis of 12 per cent annually, and it is anticipated these disbursements could soon be resumed after operations are again commenced at the mine.

BRITISH COLUMBIA.

100 Ton Mill for Bowena Copper.

The Bowena Copper company, whose property is situated on Howe Sound, British Columbia, is constructing a concentrating mill, with a daily capacity of 100 tons. The plant is being installed by Messrs. T. A. Walsh & Co., Ltd., of Vancouver, B.C.

Developing Galena at Lanark Mine.

Another strike is reported on the mine of the Lanark property, Illecillewaet, B.C., two to three feet of solid galena being reported to have been developed in No. 2 tunnel. This mine looks more promising as development continues, several first class bodies of ore having been blocked out in the course of the last few months. A meeting of the stockholders will be held on the 5th of January at Yakima, Wn., for which point Mr. W. B. Dornberg, the manager, left some days ago.

Rambler-Cariboo.

The Rambler-Cariboo Mines Company, according to estimates of its president, Mr. A. F. McClaine, has made a profit of $20,000 during the current year. Gross returns were $80,000. No dividends will be declared this year, but the profits have increased the company's surplus to approximately $50,000. This property is situated in the Slocan District, British Columbia.

Duncan River District.

The British Columbia Government proposes opening up the Duncan River District, which is highly mineralized, by the granting of financial assistance for the construction of a wagon road. The minerals of the section, which has been handicapped in its development because of lack of transportation facilities, include gold, silver, copper, lead and zinc which occur under promising conditions.

WAR WORK OF THE U. S. BUREAU OF MINES.

Washington, December 18.

How a great governmental agency engaged in saving the lives of miners and promoting the welfare of the industry, at the call to arms was instantly turned into an engine of death and destruction to enemies, is detailed in the annual report of the U. S. Bureau of Mines, Department of the Interior, by Van H. Manning, the Director.

The report, which closes with the fiscal year June 30, while the United States was still at war, tells of the strenuous part played by the Bureau of Mines in assisting to build up the terrifying machine of death that would not have been felt with its fullest force by the Hun until the following spring.

At the same time great good for the future peaceful pursuit of industry in this country and for the saving instead of killing of men has come out of this welter of death-dealing experiments, is the claim of the Bureau of Mines. Certain experiments with delicate instruments known as microphones and geophones, in order to detect the direction and the distance of enemy mining work in tunnelling and the location of enemy artillery no matter where placed, has disclosed that these same instruments can be of use in determining the location of men entombed in mines following disaster. It is expected that, if the men have the presence of mind to make even a slight noise, the rescuers listening with these devices will be able at once to locate the men and begin the rescue work. Men thus entombed have been known to live for a week or longer under such circumstances, the rescuers being unable to find them. Other men have died before they could be located. The bureau will equip its rescue cars as soon as possible with these devices.

The war experience of the bureau is going to help peace industries in still another direction. The coal experts, eager to do their share in winning the war, were assigned to the testing of boilers to be used in the ships of the Emergency Fleet Corporation. Speed, and the saving of coal were demanded. The result was that the experts so changed the design of the boilers that the coal heretofore necessary to send the ships along for six miles was sufficient to carry them seven miles. This great saving will be available in peace times.

Early in the war every experiment station of the bureau in the mining districts of the country at once closed its peace activities and marshalled for war. The entire bureau and its men and equipment were offered to the two war services. Especially pressing scientific problems were allotted to the different stations, and where the bureau did not have all the men necessary, it turned over its laboratories and equipment to the men assigned by the War and Navy Departments. In this way a central-control laboratory for the testing of materials of war was established at the Pittsburgh station of the bureau by the Ordnance Department. Steel for cannon, material for cartridges and other materials used by the Ordnance were here tested for flaws and weaknesses. The War Department was determined that no soldier, in the emergency of battle, would be able to say that his gun failed him because of faulty material.

The War Department next seized upon the opportunity of using the bureau's explosives station and bomb-proof a few miles from Pittsburgh, and there many important, yet secret tests into the action of new and deadly explosives, were made under the supervision of the bureau's and armies' experts. Information of the greatest importance to the war-making powers was obtained.

Early in February, 1917, when war between the United States and the Central Powers seemed inevitable, the bureau offered its services in the study of poisonous gases and gas-masks to the War Department, which was

accepted. This was the beginning of the great organization of 1,700 chemists who constituted the Chemical Warfare Service at the American University at Washington and whose jurisdiction was afterwards turned over to the War Department. The bureau claims that as a result of its work, the United States was months ahead of where it otherwise would have been, and the soldiers all had gas-masks of such quality that the War Department some time ago issued a statement to the effect that the gassing of a soldier was to be considered in the future as a matter of ignorance. Still further it is claimed by the bureau that through the energy of its research organization, the large-scale production of toxic gases was far ahead of the supply of shells.

The Ore Dressing Laboratory of the Haileybury School of Mines

By J. A. McRAE.

The ore dressing laboratory of the Haileybury School of mines is completed, and last week the plant was subjected to a trial run. The services of Douglas A. Mutch, formerly manager of the Temiskaming & Hudson Bay Mines, and now connected with the Coniagas mines, have been engaged, and the next few weeks will be spent in tuning up the plant preparatory to regular utilization as a demonstration plant for the benefit of pupils, as well as for affording to the mine operator of the whole of this part of Northern Ontario facilities for developing a process for treating ore peculiar to their mine and under their own supervision. The formal opening will probably not take place until some time in February.

The members of the school board include some of the leading mining men and metallurgists in the Dominion. In this respect the school has been exceptionally fortunate. These men have given freely of their services, believing that in doing so they have performed a patriotic duty to the country, and have religiously adhered to the principle of doing their best for the mining industry. This is the chief aim of all able mining men who follow the great and fascinating business of mining to a point where achievement gives greater satisfaction than does salary or position.

Mr. F. D. Reid, manager of the Coniagas Mines, Cobalt, is chairman of the school board, the other members being J. J. Denny, manager of the Research Department at the Nipissing Mine, M. F. Fairlie, manager of the Mining Corporation of Canada, and E. A. Collins, formerly mining inspector for this district.

Equipment

The mill with which the Haileybury Mining School is equipped marks the highest point towards which the world's metallurgists have attained. The plant and machinery designed and installed by men who have attained to the heighth of the profession of mining and metallurgy, is among the most modern and flexible ever constructed. The plant was designed with the object in view of providing a plant suitable for treating ore by amalgamation, gravity concentration, flotation, using a single process, or using the various processes in any desired combination. The flexibility of the plant, therefore, makes it possible to duplicate the work of the various mills in operation throughout the district, or offers wide scope in conducting original tests. The following is a brief summary of a part of the tests and combination of tests possible to carry out in the plant:—

1st. Straight gravity concentration test, by crushing to the desired size in stamp battery and tube mill and concentrating the crushed product on jigs and concentrating tables.

2nd. Concentration followed by cyanidation.

3rd. Straight cyanidation, in which provision is made for all sliming and agitating process, or leaching the sand and agitating the slime. Provision is made to precipitate values from the pregment solution by sodium sulphide, zinc-dust, or aluminum dust.

5th. Amalgamation followed by concentration.

6th. Amalgamation followed by cyanidation.

7th. Amalgamation followed by a combination of concentration, cyanidation or flotation.

The equipment consists of a small jaw-crusher, a battery of three light stamps, amalgamation plate, classifiers, tube mill, concentrating tables, agitators, thickeners, and flotation machine. The building of which the plant takes up the first story is 65 ft. by 35 ft. and is of brick.

The upper floor of the same building contains a carpenter shop, analytical laboratory, machine shop and blacksmith shop. The assay office is on the first floor.

From the interest being manifested on every hand it appears to be quite evident the entire North Country will take advantage of the opportunity the institution offers the boys of High School standing, as well as the course for mill-men, miners, prospectors and others engaged in mining work. That in various ways the cost and the effort expended will be returned in multiplied form is not doubted in view of the fact that the school is situated in such close proximity to the silver mines of Cobalt and the gold mines of Porcupine, Kirkland and Boston Creek, as well as the silver mining camp of Gowganda and other outlying mining districts.

It is considered fitted that leading mining men of Cobalt (the first real precious mining camp to be developed in the province of Ontario) should have placed such an important part in establishing such a school in its sister town. Also, the town of Haileybury is considered fortunate for having been chosen as the most suitable location for such an institution. A number of Haileybury's oldest residents, outstanding among which is License Commissioner George T. Smith, together with W. A. Wilson, principal of the school, first voiced the idea of establishing a mining school in Haileybury. The suggestion found early support from all parts of the district, and particularly from the Cobalt district.

How To Begin.

In establishing a mining school, many factors must be taken into account. First is the demand for such an institution. Second is the expense. Third is the choosing of a suitable location; and, fourth, is being able to enlist the services of competent mining men and metallurgists for its designing and construction.

In this district the demand was great. The favorable effect it should have in the matter of increasing the standard of skilled labor at the mine should be almost immediately felt. Already the services of boys with course as yet not completed are being sought for by the mines of the district. As for the location, it is within five miles of the heart of the great Cobalt silver camp, and almost on the southern fringe of the great gold zone which includes the already proven camps of Porcupine, Kirkland Lake and Boston Creek, as well as the great sweep of country in which rock formations are such as to point toward the likelihood of the discovery of other large precious metal camps. As for being able to enlist the services of efficient mining men and metallurgists, the Haileybury School of Mines has been exceedingly fortunate, as already stated. Also, concerning the matter of financing, the way has been made easier than that which might fall to the lot of another such project were an attempt to be made at its duplication in other districts. Of course, provided the demand is sufficiently great for such an institution, and provided it can be shown that the enterprise will undoubtedly be carried through successfully it is quite reasonable that limited financial assistance from the government should be forthcoming, for a time at least. However, more than this is necessary. For instance, the Haileybury School and equipment cost upwards of $30,000. The great majority of the machinery was donated by mines, manufacturing concerns and private individuals. Had it been necessary to purchase this equipment, pay for the services of leading mining men and metallurgists in order to attain the present high degree of perfection, the cost might reasonably prove too heavy for the average community to undertake, and might, therefore, result in the finished plant falling far below the desired standard. It can therefore be seen that the first consideration before undertaking such a task is to have the unremitting support of the leading mining men of the district for which the school is being planned to serve, as well as the entire community. Unless the successful completion of the plan outlined can be clearly seen it would be dangerous to make a beginning. After following the trend of progress made since the commencement of the Haileybury School of Mines the foregoing deductions come to mind. Should they prove to be of value to any other community in which such an institution desires the advantages offered by a modern flexible milling plant, they will have served their purpose.

MAY ENLARGE TRAIL COPPER REFINERY.

The management of the Consolidated Mining & Smelting Co. of Canada has made a reassuring statement with respect to the future demand for metals and the general effect of the termination of the war on the mining and smelting industry, which is the backbone of the Eastern section of British Columbia. At present the Trail Reduction Works are working on an order for spelter; but the outlook for orders for copper and lead are not, as yet, bright. Silver and gold, of course, take care of themselves. It is stated to be the intention of the Consolidated Company to continue operations on the present basis as long as possible, and more or less extensive plans have been made for keeping practically the normal force of men at work on construction or development. The Consolidated Company, now that the Canada Copper Corporation is stopping work definitely at its smelter at Greenwood, B. C., will handle the concentrates produced by its mill at Princeton, B. C., which is expected to be running next year. Should the situation develop as indicated, the enlargement of the Trail copper refinery to practically three times its present capacity —it being now 20-tons daily—will become necessary. This would mean considerable construction work and probably some changes to the copper furnaces and converters. Then, with the greater demand for gold and a less cost for supplies probably at no distant date, the tonnage to be taken from the Rossland gold-copper mines of the company should be materially increased. Gold mining, it is thought, with more staple conditions prevailing, will become more popular.

THE GIBBS BREATHING APPARATUS.

Self-contained breathing or rescue apparatus is a device by which man is enabled to do work in places where he is by nature unfitted to go or live. Breathing apparatus of the self-contained type was first introduced into this country in 1907, following which various types of apparatus manufactured in England and in Germany were installed at the mines and industrial plants of Canada and the United States.

Until 1912 no effort was made to develop an American made apparatus. Investigations conducted by the United States Bureau of Mines demonstrated very forcibly that there was much room for improvement in the various types of European made apparatus, and work was commenced by the various engineers, physiologists and chemists of the Bureau of Mines for the development of an improved type of oxygen breathing apparatus.

The **Gibbs Oxygen Breathing Apparatus** developed by W. E. Gibbs of the U. S. Bureau of Mines, Department of the Interior, is the result of six years study, research and experimental work by these experts. Early in the year 1918 the manufacture of the Gibbs Apparatus was begun at the plant of the Edison Phonograph Works, Orange, N.J.

General Requirements of Breathing Apparatus.

In order to be safe and efficient, self contained breathing apparatus, whatever its type or the details of its construction, must comply with certain basic requirements. These requirements have been outlined by experts as follows:

(1) An oxygen supply adequate alike to conditions of rest and violent exertion, and capable of being adjusted to last as long as possible, in case the wearer should happen to be imprisoned in bad air by a fall of rock or other cause.

(2) Such efficient absorption of the carbon dioxide exhaled that the wearer, even during vigorous exertion and hard breathing is not compelled to reinhale enough carbon dioxide to appreciably interfere with his capacity for exertion. One per cent should be the maximum, and less than half of one per cent the aim. The absorber should be able to take up an amount of carbon dioxide corresponding approximately to the total oxygen supply carried.

(3) Freedom from mechanical obstruction in the apparatus, so that the wearer may inspire and expire even during the most violent breathing without noticeable impediment; no negative pressure at any time,

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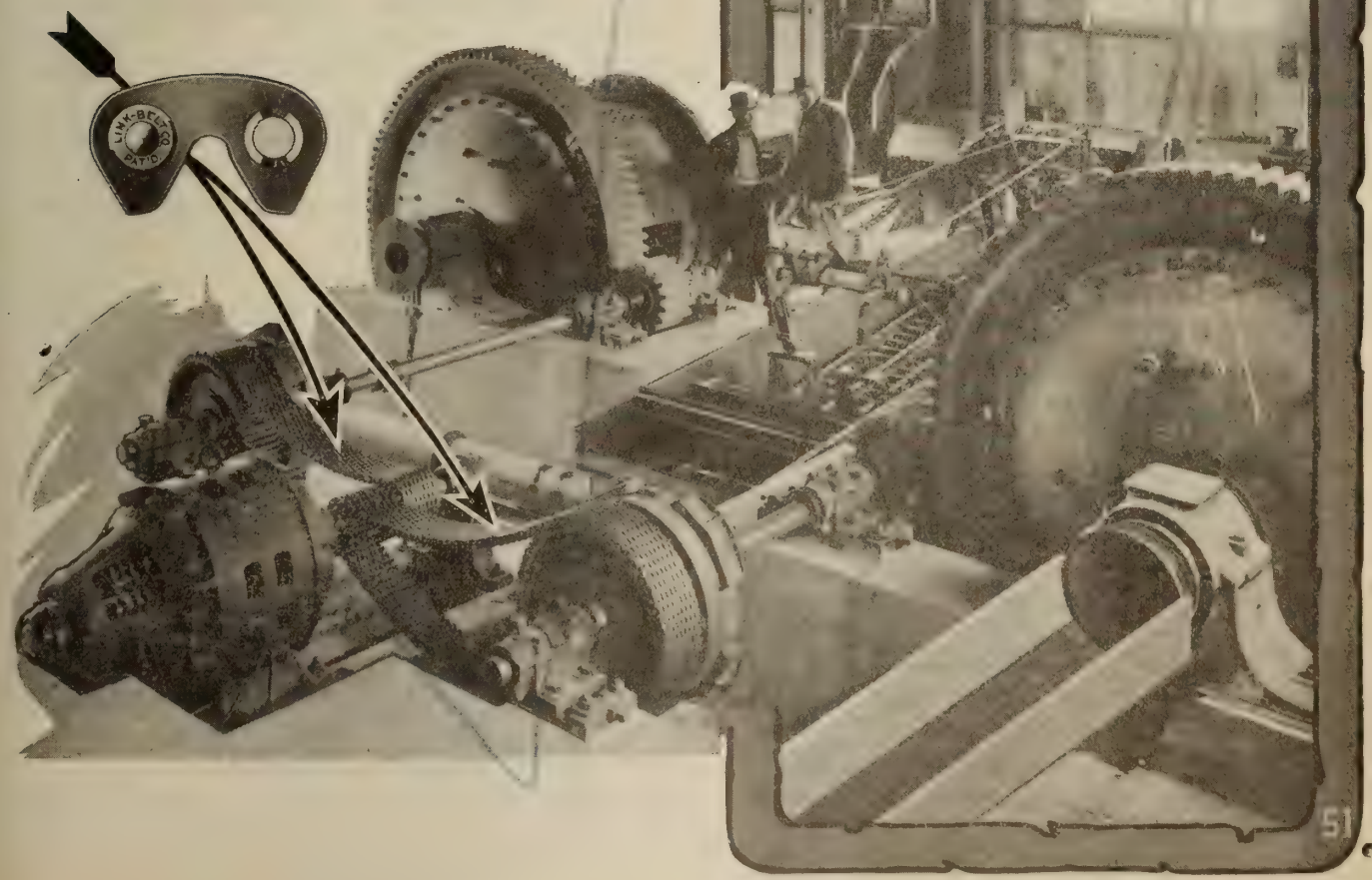

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as poisonous gases are liable to be drawn in; and a positive pressure at the mouthpiece of not more than 2 inches water gauge even during the most forcible expiration.

(4) Arrangements to obviate the danger of the breathing bag or bellows being breathed or squeezed empty when the wearer is crawling in a low passage, as he is then unable to inflate his lungs and may throw off the apparatus.

(6) Tightness of the apparatus so that not even the smallest quantity of the poisonous gases by which the wearer may be surrounded can be drawn into the apparatus and so reach his lungs, the apparatus to be as nearly accident proof and "fool proof" in this respect as possible.

(6) The avoidance of an excessively high temperature—as produced by the absorbers now in use—and efficient heat radiation.

(7) Simplicity of construction and such arrangements as will effectually protect the vital parts from breakage by striking against walls or roof or from the wearer's happening to fall.

The Gibbs apparatus was designed along the lines indicated in these general requirements and it is conceded by experts as having successfully filled the specifications.

CANADIAN MINING JOURNAL IS NOW A WEEKLY.

Beginning with the Jan. 8th number the Canadian Mining Journal is to be published weekly. With an enlarged staff and more frequent publication we will be able to give the mining industry better service. There have been some unavoidable delays in publishing the first two numbers, and some unsatisfactory productions owing to our new printing plant at Ste. Annes having to turn out work before the builders were quite through with construction. We can assure our readers that we will soon be publishing a much improved journal, with many more contributors. News from the mining districts will be published more promptly and there will also be more technical articles of interest to those who are operating mines and metallurgical works.

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1 12-in. x 15-in. two-drum Jenckes Tandem Hoist, with one 20-in. auxiliary drum and one nigger-head mounted on the shaft extension. Second-hand, but in good condition.

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:-: EDITORIAL :-:

THE ENGINEER AND THE CANADIAN MINING INSTITUTE.

In this issue we publish another letter on the character of the Canadian Mining Institute and the Engineering Institute of Canada. In this letter, Mr. J. A. Reid agrees with us that the former represents the mining industry while the latter represents merely a profession. He quite rightly complains of the inadequate salaries paid to engineers. He seems to be of the opinion that a purely professional society might look after the interests of its members better than does a society which represents an industry.

One of the reasons that the Engineering Institute is devoting so much attention to the status of its members is because of belated recognition of the fact that its members need to take united action in order to secure their proper position in the community. Mr. Reid evidently sees the activities of the Engineering Institute grounds for hope of securing for engineers such privileges as are enjoyed by members of the legal and medical professions.

This striving after improvement in the status of engineers by class legislation is, we believe, doomed to failure. The general interests of the country do not permit the granting of special privileges to engineers or to any other group of workers. Mining engineers who look on the Canadian Mining Institute as an instrument for obtaining privileges have, in our opinion, entirely mistaken the purpose of existence of the Institute.

While we would not like to see the Mining Institute attempt to obtain by legislation special privileges for its members, we do think that it might endeavor to look after its members in other ways. It might, for instance take an active part in looking after the welfare of its members by assuming more responsibility for their employment. A special opportunity for service to members is now before us. Men are returning from overseas and should be helped in their efforts to secure positions. If managers' willing to take on engineers would advise the secretary of their needs and all returned men would communicate with the secretary, very important assistance could be given to members who have been on war service.

Mr. Reid sees in legislation the remedy for low salaries. We cannot agree with him that the desired end is to be reached in this way. Some of the worst offenders in the paying of small salaries are those who like to be considered leaders in the profession. The remedy for unfair salaries lies with those directly concerned. There should be more frank discussions between managers and the engineers on their staffs. There should also be more open discussion in the Mining Institute, where other leaders in the industry as well as engineers could take part. Is it not important that engineers should bring this matter to the attention of managers and directors of mining and metallurgical works and to others interested in the industry, whether such men happen to be engineers or not? Is it not actually an advantage to the engineer that one-fifth of his audience in the Canadian Mining Institute represents other sides of the industry and can be expected to come to the assistance of the engineers, if the latter present a strong case.

The advancement of the status of the mining engineer is not the chief purpose of existence of the Canadian Mining Institute. Since, however, four-fifths of the members are technically trained men and the other fifth is composed of men whose sympathies as well as interests are with the technical men, it is obvious that the Institute is able to advance the interests of mining engineers.

As expressed in our editorial of November 15th, which started the discussion, the chief purpose of the Canadian Mining Institute is to assist in the development of Canada's mineral resources. The purposes, according to the charter, are: "First, to promote the arts and sciences connected with the economical production of valuable minerals and metals, by means of meetings for the reading and discussion of technical papers, and the subsequent distribution of such information as may be gained through the medium of publications. Second, the establishment of a central reference library and a headquarters for the purpose of this organization. Third, to take concerted action upon such matters as affect the mining and metallurgical industries of the Dominion of Canada. Fourth, to encourage and promote these industries by all lawful and honorable means." The improvement of the status of mining engineers will come with more general recognition of the value of the services of engineers. They must lend their abilities to the service of the community and they must also let the public know that they are doing so. By greater service and by more publicity there will be attained better recognition. Mining engineers have in the Canadian Mining Institute a splendid medium for making themselves useful to their fellow engineers and to others in the industry. By helping one another they will make the Institute stronger. The Institute representing the in-

dustry can help mold public opinion with regard to the industry and the men in it. We do not claim that the Institute has done all it might do; but we do claim that it occupies a place in the industry, that it has important work to do, that it fills the need for a professional society without being merely a professional society, that it is aiding in securing the much desired application of science to industry, and that it provides a means for social intercourse that is of advantage to both members and the industry.

Even those who look on membership in societies as a means of advancing their own interests should see in the inclusion of non-professional members many advantages. If the engineer wishes to advise those who are directing or managing mining and metallurgical companies of needed reforms and of necessary safeguards for the good standing of the profession, the Institute offers an excellent medium for discussion. Non-professional members who put up money for mining ventures are just as keenly interested as engineers are in the status of the engineering profession. They may be counted upon to assist in the exposure of fakirs and to approve and support proposals for educating the public against spending money on properties that have not been examined and favorably reported on by competent men. We would not like to think that many men belong to the Canadian Mining Institute simply because they expect it to improve their professional status, but even these will find some value in such membership.

In our opinion mining engineers should join the Canadian Mining Institute with the object of encouraging and promoting the mining and metallurgical industries by all lawful and honorable means, as set forth in the application for the charter. By serving the industry in this way they will undoubtedly serve their own interests also, for they will profit by the work of their fellow members. Those who give much from their own experience receive much in return.

THE HAILEYBURY SCHOOL OF MINES.

In this issue we present some account of the Haileybury School of Mines. Our readers will be especially interested in this for several reasons. The provision of facilities for study, in a mining district, of mining and metallurgy is itself much to be desired. Even more important is the evidence of interest taken by mining men and by manufacturers of mining and milling machinery in the establishment of the school. These men are deserving of more credit for what they have done for the coming generation than they are likely to get. It is not an easy matter to obtain such practical interest in educational matters, as many educators well know.

With the guidance of the men who have played a large part in establishing the Haileybury School of Mines, we may confidently expect that institution to turn out men who will be fitted not only for technical work in the mining industry, but also trained in good citizenship. These young men will soon be playing a large part in developing Northern Ontario. They will do well to remember what is now being done for them and endeavor to uphold on every occasion the honor of their school and in later years to do their part for those who follow them. The school will be known by its graduates. Those who have assisted in fitting these students for their work in the industry will measure their success by the character and ability of the graduates, and by the interest which the latter take in the school after they leave.

THE FUNCTION OF OUR SCHOOLS AND COLLEGES.

One of the leaders in the campaign for education better fitted to the needs of our citizens is Mr. C. V. Corless, of Coniston. In an address to the College and High School Department of the Ontario Educational Association last April, Mr. Corless said in part:

"It is not the main business of our schools and colleges to impart that knowledge which is mere information; nor even to cultivate, to stimulate the power of research, discovery and independent thinking—of vastly greater importance though this may be; but it is their main business, as I conceive it, to lay the foundation of, and as far as opportunity offers to build in each student who passes through them, that sound and sterling character which is manifested in all social relationships by standing foursquare to every temptation, economic or other. So far, we are probably all agreed. Where we may differ is in coming to a conclusion as to the most sane and efficient way of doing this. * * * We must regard it as the chief intellectual aim of school and college education to assist the student to acquire that vitalizing contact with, that intelligent rooting of experience in, those real things and activities of the world in which he lives, which alone stimulate and sustain real mental growth, and an intelligent inductive study of which secures best the material progress, and strengthens most the moral purposes of mankind. This alone will form a secure foundation for civilization based on justice, good-will and the acceptance of responsibility.

"Among the gravest defects of our entire general educational system at present are the paucity of actual material things brought into use as an educational medium; the assumption that real education can be acquired chiefly through a carefully graded manipulation of the symbols of knowledge; the too ready acceptance of facility in the use of these symbols as a substitute for real education and the failure to discern clearly the undemocratic evils which necessarily result from a programme and methods based on this false conception. This has resulted in inefficiency in many directions. For we must conceive the intel

lectual aims of real education to be the acquirement of that power and eager desire which grapple quickly and intelligently with the difficulties of such original practical situations as arise in life outside the schoolroom; the attainment of that readiness and adaptability which quickly bring to bear on the solution of such difficulties, every available resource or experience, whether obtained personally, or through consultation with others, or from accumulated stores of recorded experience. It must develop: that originality which quickly discerns a new problem and seizes on its essential conditions; that concentration which leads to its clear statement and the rejection of irrelevant conditions; that judgment which selects with reasonable sureness the problem worth tackling and rejects the problem incapable of solution or the one likely to cause the frittering away of any unreasonable amount of time, energy or capital in effecting its solution.

"The effective cure for social ills in a democracy —inclusive of the antagonism between Capital and Labor—can be found only through an educational system that takes clear account of them; that adapts its training to meet them; that has ample resources and authority committeed to it for this purpose; that accepts full responsibility for doing so; and that definitely concentrates its full resources and the best ability procurable on the problems of society. This may, and, I believe, does, mean a greatly increased scope and outlook for the work of education. This can never be accomplished by schools and colleges that work in semi-isolation from the practical affairs of the world around them. It can only arise from educational institutions having the most vital relationship to their surroundings, physical, industrial and social. Our schools should shed tradition and rise to democracy's great needs."

Mr. Corless speaks with the authority of experience as teacher and as manager of an important industrial concern. Long and earnestly he has given his attention to the problem of providing better education for the communities in which he lives. He has recently come out into a wider field, and we believe that he will draw many to his standard in the fight for educational reform.

Mine managers frequently find themselves in the position of leader of a community. They must give much attention to the housing, recreation and education of the families of their employes. They could assist Mr. Corless and his co-workers by drawing on their experience. Others can assist by making themselves familiar with the literature on the subject and by giving publicity to the suggestions which appeal to them as specially helpful. The cause is a good one and worthy of the support of the industry which claims the sage of Coniston.

MINING SOCIETY OF NOVA SCOTIA.

The annual meeting of the Mining Society of Nova Scotia will be held in New Glasgow on the 23rd and 24th of April. Arrangements will be made to visit the collieries of the Acadia Coal Company and the works of the Steel Company at Trenton, and to have a number of papers which will deal with such diversified mining matters as new methods in limestone quarrying, new discoveries in the Pictou coalfield, local manufacture of refractories and bricks by the steel companies here, oil-shale development, electricity applied to mining coal, local salt mining development, etc. A full meeting is expected, as New Glasgow is centrally located.

THE PAS BOARD OF TRADE ON LEASEHOLD SYSTEM.

At a meeting at the Pas some weeks ago the following resolution was passed:

"The Pas Board of Trade hereby resolves that the regulations now in force whereby a lease is granted for mineral properties staked under the Quartz Mining regulations should be cancelled, as being inimical to the progress of the mining industry in Manitoba, and that the freehold system formerly in force be reestablished; and that a copy of this resolution be presented to the Manitoba Branch of the Canadian Mining Institute at its first meeting for further consideration."

B. C. Mine Owners Will Not Recognize Committee

That the Mine Owners Association of British Columbia will not recognize the Committee which has been authorized by the Dominion Government to investigate the question of the rates charged for ore treatment by the Consolidated Mining & Smelting Company at its Trail Smelter is the effect of a statement issued by C. F. Caldwell, president of that Association. He says:

"I am in receipt of a notice of a meeting of the Committee appointed by the Associated Boards of Trade of Eastern British Columbia, and approved by the Dominion Government to make the investigation into the smelter rates at the Trail Smelter to be held at Nelson, B.C., on January 21st.

"I, as president of the Mine Owners' Association, cannot recognize this Committee as meeting the conditions of the petition of the mine owners, circulated and signed by a majority of the mine owners, mine workers and business men of the entire Slocan District, and presented to the Dominion Government by myself in person.

"Should the mine owners appear before this committee, they would be giving their approval of this mode of investigation. When we publicly protested to both the Dominion and Provincial Governments against the committee form of investigation, believing it was brought about for the express purpose of defeating the resolution of the mine owners, which asked for the appointment of a Royal Commission, one member to be chosen by the mine owners, one by the smelter, and by the government. This would have been an investigating commission which would have brought results."

Correspondence

MANITOBANS WANT FREEHOLD SYSTEM.

To the Editor of the Canadian Mining Journal:

Sir,—In connection with the question of freehold versus leasing system for acquiring rights on mining lands, recently raised by the resolutions of The Pas Board of Trade and the Manitoba Branch of the Canadian Mining Institute, several points of view as held by those representing the mineral industry in Manitoba must be presented.

It appears that the Canadian Mining Institute placed itself on record recently as being in favor of the principle of leasehold tenure of mining claims and the case was so presented to the Dominion Government. Probably this move on the part of the parent Institute had a good deal to do with influencing the framers of the order-in-council which inaugurated the leasehold system for Dominion mining lands in the Prairie Provinces. It should be pointed out in this connection that at the time this change was considered, there was little development and few indications of immediate development of mineral wealth on these Dominion lands, and the Western Provinces, in which the scheme has been applied, had little or no representation of those interested in metal-mining, in the Canadian Mining Institute.

Since the time of the passing of the order-in-council, there has been considerable development of metal-bearing claims, particularly in Manitoba, and the many new and promising discoveries of the past few months in this Province indicate that there will be a considerable production in the near future from Dominion mining lands, providing that conditions be made favorable. At the same time there has been a growing body of mining opinion, and the Province for the first time is represented by a strong Branch of the Canadian Mining Institute.

In the older mining Provinces of British Columbia and Ontario and in most of the Eastern Provinces, there has been no strong tendency shown to follow the advice of the Canadian Mining Institute, by introducing the leasehold system of tenure, and the mining interests in Manitoba feel that they are in a disadvantageous position, having the leasehold system adopted for them while on either side the old freehold system still attains.

The question is intimately bound up with the demand of the Western Provinces for their natural resources. Had Manitobans felt sure that their resources would soon be handed over to them, the question of the system of tenure would not have been raised. If the resources are not handed over to the Province and the leasing system is retained, we have the mining industry of Manitoba placed in a ridiculous position as pointed out recently by Professor Wallace, Commissioner of Northern Manitoba:—So far the Dominion Government has not undertaken the onus of directly aiding mineral development on Dominion Lands; at the same time the Provincial Government can not be approached for aid for the simple reason that they have no interest in and no prospect of acquiring interest in and revenue from mineral production. If the old freehold system were still in force, the Provincial Government would see some prospect of getting control of the producing mineral lands, and could legitimately take a direct interest in fostering mineral production.

If the other mineral-producing Provinces were working under the leasing system, the case for Manitoba would not be so strong; but as it is, Manitobans seem to have legitimate ground for their belief that the present arrangement results in a discrimination against them, particularly in connection with the attraction of the large amounts of capital so necessary for the development of mineral resources in the present inaccessible portions of their Province.

It is the intention of the Manitoba Branch to present their case to the Canadian Mining Institute before taking any other action; and it is to be hoped that the order-in-council, to which they object, will be the object of some attention during the next session of the Dominion Parliament, unless it is intended that the Western Provinces shall assume control of their resources in the near future.

The writer, as Secretary of the Manitoba Branch, feels that it is his duty to present at least part of the Manitoba case, and to introduce a discussion, into which it is hoped some others from Manitoba and the other Prairie Provinces will enter, and from which those of other Provinces who are interested in the question, will grasp our point of view.

Yours, etc.
J. S. DeLURY,
Sec., Manitoba Branch, C.M.I.
University of Manitoba, Winnipeg,
Jan. 20th, 1919.

THE ENGINEER AND THE INSTITUTE.

To the Editor of the Canadian Mining Journal:—

Sir,—Two editorials, one of the Canadian Mining Journal (Nov. 1st 1918) and the other of the Canadian Engineer (Nov. 7, 1918), discussing the respective professional standings of the Canadian Mining Institute and the Engineering Institute of Canada have been subjected to considerable criticism in the letters of several members of the former society published in the December Bulletin of that Institute. These correspondents take the ground, that the Mining Institute as a professional body is quite on a par with the other, and moreover better fitted to represent the profession of mining engineering than the Engineering Institute, and that therefore the conclusions arrived at in the two editorials were entirely unjustified. I may say however, that I found the arguments advanced by these gentlemen quite unconvincing, and that from the standpoint of a professional mining engineer I find myself in accord with the views expressed by the two editors.

In my estimations a technical society is a body composed purely of technical men, who are banded together for their mutual interest, and the advancement of that particular branch of technology to which they belong; such an organization is comparable to the Medical Society, Bar Association, or other such purely professional body. An Industrial society on the other hand, while it may have many points of resemblance to a technical society proper, differs in being devoted to the interests of the industry as a whole instead of to those of any particular growth within it, for which reason it has a mixed membership representing different phases of the industry in question.

The Canadian Mining Institute certainly belongs to the latter class. I fail to see how, with a non-technical membership variously estimated at from 20% to 25%, to whom are open all the privileges, including election to the highest offices, it can claim to be anything else

than an industrial organization. [Associate members, of the Canadian Mining Institute are entitled to vote but not to hold office—Ed.]

The Engineering Institute of Canada, on the contrary, is a purely professional institution. Only engineers compose its active membership and direct its activities. Until recently it was mainly a civil engineering society, but of late it has broadened its charter and endeavored to enlarge the scope of its functions, so it would be well for mining engineers to consider what advantages they might derive from its membership.

It is an unfortunate fact that the technical professions, including the various branches of engineering, are very poorly paid. The graduate of a school of applied science of several years experience, receives a salary hardly on a par with the wage of a mechanic, or the stipend of a clerk. Of this then is abundant proof. I need only refer to the statements of Mr. A. A. Cole, past president of the Canadian Mining Institute, relative to the salaries offered to applicants for legal and technical positions in the Civil Service of Canada. In the first case, the salary was $3,300 per annum and the requirements such that they could easily be fulfilled by any mediocre lawyer, while in the second, the salary was $1,600 per annum, and the applicants had to show qualifications practically equivalent to a Ph.D. degree in science. Recently a still more flagrant example has come to my attention. I was shown a circular letter from the Civil Service commission dated Nov. 21st 1918 in which three positions are advertised.

(1) A secretarial clerk at an initial salary of $1,800 per annum.

(2) A female clerk for the Department of Labor at an initial salary of $1,600 per annum.

(3) An assistant engineer for the B.C. Hydrometric survey who must be a university graduate with two years field and office experience at an initial salary of $1,500 per annum.

These facts speak louder than words of the esteem in which the engineering and technical professions are held in Canada.

As to the profession of mining engineering in particular, what do we find? Not only are the salaries paid to the bulk of its members on a par with that above set forth, but in addition, it is infested with charlatans and impostors who practice their knaveries without let or hindrance on the part of the law, to the great detriment of the fair name of the profession.

In my mind there is only one remedy for this state of affairs, and that is, the formation of a strong professional organization which will take the needed legal steps to secure the interests of its members, and which will give them a professional standing equal to that of the legal and medical professions. The Engineering Institute of Canada does in great measure fulfill the requirements as above set forth; it is purely a professional body and it has made efforts to obtain the legal protection of its members, with some degree of success, as witness the Quebec and Manitoba acts relating to civil engineers. As mentioned above, this society has now broadened the scope of its activities and is attempting to secure the affiliation of allied branches of engineering. If it is successful in this endeavor there is no doubt that an effort will be made to revise the status of the engineering profession in Canada and likewise to give a much needed legal protection to its members.

In the Canadian Mining Institute I believe that an effort is being made to make a distinction between the technical and non-technical members. Personally however I am doubtful of the success of this measure, as it will probably provoke the opposition of the influential non-technical section, who will likely regard it as an attempt to bar them from full participation in the privileges of the Institute. Even if successful, it still remains doubtful whether the professional members will gain much prestige thereby. The institution as a whole will still retain its original character in the public mind, so that differentiation between technical and non-technical members will be difficult for outsiders; considering the matter therefore, from the standpoint of the professional mining engineer, let us consider the relative advantages offered by the two societies.

The Engineering Institute is a clear cut professional organization, devoted primarily to the interests of its members and not connected with any particular trade or industry.

The Canadian Mining Institute on the other hand is somewhat different in its aims, being essentially devoted to the development of the mining industry, and hence not concerned with the interests of its members except in so far as they affect the status of the industry.

In view of these facts it is obvious that the claims of the former society deserve a prior consideration over those of the latter, so much so, in fact, that it is difficult to conceive how anyone, regarding the matter from a professional view point, can think otherwise.

Finally, I think that there is abundant room for the two societies to flourish without interfering with each other's development; the mining engineer, undoubtedly, will find it to his advantage to belong to both organizations, to the Engineering Institute, to protect and improve his professional standing, and to the Canadian Mining Institute to keep in touch with the development of his calling.

Your, etc.,

J. A. REID.

Cobalt, Jan. 17th, 1919.

Canadian Collieries Planning to Open More Mines.

Considerable interest is taken by coal mine operators of British Columbia in the announcement attributed to local officials of the Canadian Collieries (D) Ltd. that plans are being prepared by the company for the opening of new mines on the Island and generally extending operations. On January 6th a meeting of the Directors was held at Montreal when the resignations of Sir William Mackenzie as president and Sir Donald Mann, as a director, were received, their places being taken, respectively, by Mr. H. S. Fleming, of No. I. Broadway, New York, and Mr. F. Perry, of Montreal.

Regulation of Coal Mining in Alberta.

At a meeting of the Federation of Labor of the Province of Alberta held at Medicine Hat, Alberta, on January 10th, several suggestions affecting the regulation of coal mining in that Province were endorsed which, if put in the form of legislation and enforced, will radically alter the present conditions. One provides for the compulsory use of electric safety lamps; another, that mine inspectors shall be elected and be subject to recall; and a third that a 6-hour day shall be granted to all underground workers.

Dr. Stansfield's Report on Electric Smelting of B. C. Iron Ores

"The Commercial Feasibility of the Electric Smelting of Iron Ores in British Columbia" is the subject of a report recently completed by Dr. Alfred Stansfield, Professor of Metallurgy at McGill University, and Consulting Metallurgist, Montreal, who is acknowledged to be one of the foremost of America's authorities in this line of industrial endeavor.

The report is lengthy, dealing with the matter from all angles in a very exhaustive and detailed manner. Its conclusions, summarized, are that the problem is perfectly feasible from a metallurgical point of view, that British Columbia has a sufficient supply of ores of a quality well suited to the process and capable of being converted into a high quality of iron or steel, and that there also are available all requisite fluxes, etc., wherewith to carry out the process completely. But two difficulties are made clear. That which is most emphasized is the question of the cost of electric power under existing conditions. Dr. Stansfield finds that, with power at the rates which he was quoted by the largest companies of the Province, the profitable production of pig iron by means of electric smelting would not be feasible. He deals, too, at some length with the market and the impression given by his observations is that the immediate local, and the demand likely to be evidenced from outside within a measurable period, are not sufficient to justify the establishment of a large plant of the character under discussion.

In this connection a few remarks by Dr. Stansfield in introducing his report are apropos. He says:

"Early in the investigation it appeared that electric power might be obtained at such a price that electric smelting by the methods now in use would be commercially possible. I, therefore, investigated and discussed carefully the type of furnace and design of plant that would best suit the local requirements, and prepared estimates for the cost of such a plant and of making pig iron on a scale determined by the present requirements of the Province. It now appears that electric power cannot, at present, be obtained at prices that will permit of the use of the usual electric smelting methods; but I am presenting the results of my investigation along these lines because they are needed to show that the process described would be too costly at this higher price, and because it is possible that, in the future, power may be available at a lower price, which would then permit of operations being undertaken. In view of the very high price asked for electric power I have paid special attention to a new process for producing electric furnace iron which offers possibilities of a decided economy as compared with standard methods."

After dealing generally with electric smelting, Dr. Stansfield, having pointed out that it is a process which has passed the experimental stage being in operation commercially on a large scale in Sweden and elsewhere, explains that the pig iron normally produced by the standard electric furnace is unusually pure and unsuitable for use in the iron foundry. He adds: "The officials of the Swedish Company consider that a foundry iron can be made by these furnaces, though at somewhat higher cost, but I have no evidence that this has been accomplished in regular commercial practice, and the Noble Electric Steel company, which smelted iron ores electrically for several years at Heroult in California, was obliged to adopt a different type of furnace for the production of foundry iron. I consider, however, that the Electro-Metals furnace could be used for this purpose because any low silicon iron could be made suitable for foundry use by additions of ferro silicon ——."

The essential conditions for the electric smelting of iron ores on a commercial scale are said to be—a supply of high grade ores at a reasonable price, an ample supply of cheap electric power, a supply of charcoal or other fuel at a moderate price, a supply of labor at a moderate price, a suitable location for the smelting plant and a suitable market for the resulting iron at a rather high price.

Dealing with his subject under these headings the writer says of the iron ores of British Columbia that they have not been opened to any extent, but that it may be safely assumed that there are "adequate supplies of ore of reasonable richness and purity at easily accessible points. These ores are chiefly magnetites, and on this account, are undesirable for use in the blast furnace, except in admixture with other ores. Magnetites are, however, quite suitable for treatment in the electric furnace. It appears that the ores are not of very high grade, but that a supply may be expected to contain from 50 to 55 per cent of iron. The ores are practically free from phosphorus and titanium, and the proportion of sulphur can probably be kept as low as 0.1 per cent. The ores under consideration are also practically free from copper. Your officials estimate that a supply of 50,000 tons per annum of ore of this grade can be delivered at a suitable smelter site, at a cost, under present conditions, of about $4.00 per net ton ,which would be made up as follows:

Mining	$1.50 to $2.00
Loading or tramming	0.15 to 0.25
Freight (by water)	1.00 to 1.50
Unloading	25 cents
Royalty to owner	50 cents
Total cost at smelter	$3.96 to $4.10

"From the information at my disposal I am satisfied that these ores can be smelted electrically for the production of a high grade pig iron. For the production of one long ton of pig iron about 2.0 net tons of 55 per cent ore would be needed, so that the ore would cost $8.00 per long ton of pig iron. In view of the somewhat low grade of the ore, the cost of smelting per ton of product, will be somewhat higher than is usual with the Swedish ores, but this may perhaps be remedied by the use of magnetic concentration."

Referring to the question of power, Dr. Stansfield says: "British Columbia is well supplied with water powers, and many of these can be developed cheaply for the use of electric smelting and similar industries. Competent engineers have assured me that some of these

powers in accessible locations can be developed at such a cost as to yield a continuous electrical horse-power for smelting at a cost of $10 per annum. This figure is not much higher than obtains in Sweden and if a dependable supply of power can be secured at this rate it seems almost certain that an electric smelting industry can be undertaken profitably. The consumption of power, under conditions obtaining in British Columbia, would be between 0.4 and 0.5 of a horse-power-year per ton of iron produced; so that the cost for power should be between $4.00 and $5.00 per long ton of pig iron. Some 8,000 or 9,000 horse-power would be needed for a daily production of 50 tons of pig iron. In view of the desirability of producing pig iron at the earliest possible time, and of the difficulty and expense attending the development of water powers under present conditions, it is highly desirable, if not imperative, that an electric smelting industry shall be supplied, in the first place, from powers that are already developed."

The writer then explains that the B.C. Electric Ry. Co. has surplus power, that when in the Province its management stated that it possibly could be delivered at $15.00 per horse-power-year, but since he had been informed that the charge would have to be $27.80 per horse-power-year, which would represent a charge of from $11.00 to $14.00 per ton of iron. The latter would be the rate on the British Columbia Mainland, but on the Island 2,000 k.w. of power would be available for a short period, and subject to peak load restriction, at $15.00 per horse-power-year. The increase, it is maintained, makes it altogether too high to allow of commercial production of pig iron by present methods at or near Vancouver City. As to Vancouver Island it is stated that its supply, "besides its uncertainty, is too small to permit of profitable operation."

In discussing the necessity of having supplies of charcoal and coke for reduction, Dr. Stansfield states that "the consumption of charcoal varies with the grade of iron required, and the type of furnace employed, from about 0.4 to 0.5 net tons of charcoal per long ton of pig iron, so that 20 to 25 tons of charcoal would be needed daily for an output of 50 tons of pig." He adds that, while there is no considerable charcoal industry at present, there is in the coast districts of British Columbia an abundant supply of timber from which charcoal can be made suitable for use in electric smelting. In view of the large amount of wood waste produced at some of the large mills it is thought reasonable that a well designed charring plant could be erected "that would utilize this waste material and deliver charcoal to the smelter at a cost of from $6.00 to $8.00 per net ton; estimated on the following basis:

2½ cords of Douglas Fir mill waste.....	$2.50
Cost of charring, less returns for by-products..	2.50
Carriage of charcoal to smelter	1.00
	$6.00

The charge per ton of iron would thus be between $2.40 and $4.00.

It is pointed out that Douglas Fir, which would probably constitute the staple supply for charcoal making, "does not furnish by-products of suitable quality and quantity to warrant the use of elaborate methods for their recovery," but the opinion is expressed that by making the charcoal "in large kilns, or in some appliance which might be devised to char the wood waste with the minimum amount of hand labour" a partial recovery of by-products could be made at moderate expense. It also is asserted in this connection that as coke cannot be produced from British Columbia coals as cheap as charcoal can be made, it would be more economical to use the latter.

Dr. Stansfield's investigations have led him to the conclusion that the cost of labor might be from $4 to $5 per ton of iron, although in the intial stages of the industry it might run as high as $7 per ton of iron. As to the location of a smelter plant he says that it should be conveniently situated with respect to the supplies of ore, charcoal and other requirements and should also permit of the cheap delivery of the iron and other products to the market. He also emphasizes the importance of having it located close to the source of electric power, so as to lessen the cost of transmission. With reference to the market it is stated that the consumption of pig iron in British Columbia now is only about 10 tons daily. It is suggested that with more moderate prices this consumption might be raised to 20 or 30 tons daily. As this would be too small to permit of economical commercial operation it is recommended that, if a suitable supply of electric power can be obtained, a plant be constructed to produce say 25 tons daily of foundry iron for sale and a further 25 to 30 tons of low silicon iron for conversion into steel.

Under the heading "Foreign Competition" reference is made to the possibility of an iron blast furnace being established on the Pacific Coast of the United States. It is estimated that pig iron could be made in such a plant under present conditions at a cost of about $25 per long ton. On this point it is added that "the duty on pig iron entering Canada from the States is $2.80 per ton plus 7½ per cent ad valorem which, at the sale price of $30.00 per ton, would amount to $2.25 per long ton, or a total charge of about $5.00. This duty, together with the freight charge and the Canadian bounty, would place the electric furnace iron, if made with $15 power, on an equality with the imported blast furnace iron. "The report continues: "In this connection it may be added that a large iron and steel plant can scarcely be built until some years after the war, so that an electric furnace plant, if constructed promptly, would command the market for a number of years. Ultimately, blast furnace iron may be expected to take a part at least of the market for common grades of iron, but the electric furnace should always be able to command a small market for its higher grade of iron."

Mention is made to the action taken by the Dominion Government recently for the encouragement of the industry in the Canadian West, which consists of the guarantee for a period of three years of the purchase of any surplus production "at the market price at the time." Dr. Stansfield's observations on this point are interesting. He says: "This agreement will no doubt apply equally to electric furnace iron, but it does not appear to me that it is likely to help matters materially, for the following reasons: 1. The offer is obviously of no use if the price referred to is that obtaining in Eastern Canada, as iron could not be made at that price. 2. If the price intended is the local price in British Columbia we are met with the difficulty that the Government's ability to carry out the undertaking would be limited to the local demand for iron, as it would be impossible for it to buy expensive iron in British Columbia and ship it to lower priced markets elsewhere. We are thus limited to the natural market for iron and steel in British Columbia and to possibilities for exportation on a small scale. Commenting on the action of the Provincial Government in respect of placing a bounty on the production of pig iron within the Province the wri-

ter states: "The Provincial Government has offered a bounty of $3 per net ton of pig iron made in British Columbia from local ores and on the other hand imposes a tax of 37½ cents per net ton of ore mined. The combined effect of these measures will be a payment of about $2.60 per gross ton of pig iron; a source of income which will be of some importance, and may sometimes make the difference between working at a loss and at a profit."

Touching on the type of furnace which should be adopted the following conclusions are reached:

"(1) If a permanent smelting plant were being erected, the Swedish type of furnace would be selected, because it is more economical than any other at present in use, and is the only one that has been employed commercially.

"(2) If a temporary plant is contemplated it may be better to install the open pit furnace, on account of its smaller first cost, and the ease with which it could be converted to other uses.

"(3) Information should be obtained with regard to the iron ore reduction process of Trood and Darrah, as this may prove superior to any direct smelting process. If this process is likely to be available, it will be best in the meantime to use a simple pit furnace, rather than to install the more elaborate Swedish furnace."

As to cost of production it is stated that a simple plant, assumed for purposes of calculation only, would consist of three electric furnaces of 3,000 K.W. each, producing altogether about 80 tons of pig iron daily, and would cost from $350,000 to $400,000 to erect in British Columbia.

The cost of making a long ton of foundry pig iron in such a plant would be estimated as follows, assuming that power can be obtained at $15.00 per horse-power-year:

Iron ore, 2.0 net tons at $4.00	$8.00
Electric power, 0.45 h.p. year at $15.00	6.75
Charcoal, 0.4 net tons at $8.00	3.20
Electrodes, 15 lbs. at 8 cents	1.20
Repairs and maintenance	1.00
Labour	4.50
Management	2.00
Interest, 6 per cent on total capital, and depreciation, 10 per cent on cost of plant	2.60
Royalty to Electric-Metals Company	0.50
	$29.75

A further table is given showing that, with 0.5 cent power the cost per ton of pig iron would be $40.50.

Dr. Stansfield refers to a new process by which granulated oxidised ores mixed with carbon are roasted in a fuel-fired furnace and thus reduced to the metallic state. This reduced metallic sand is then melted in an electric furnace at an expenditure of 1-3 of the electric power required to both reduce and melt the ore in the electric furnace. This process, it is pointed out, seems to offer possibilities to electric smelting that are now lacking. The process, however, is only in the experimental stage, and is not available at present, but may in the future bring electric smelting of British Columbia iron ores within commercial reach.

In his general conclusions Dr. Stansfield again outlines the general requirements for a successful industry; dwells on the importance of the price of power which is higher, as quoted by the company having the largest supply of unused power than the industry could bear; and asserts that "in view of the small demand for pig iron in British Columbia it would be almost essential, if a smelting plant is to be established on an economic basis, that additional products should be turned out. Steel for castings and small rolled sections, and ferro alloys such as ferro manganese, ferro chrome and ferro silicon, could be made suitably in such a plant. These additional products would permit of more economical operation, would enable larger profits to be made, and would allow the plant to continue in profitable operation if, at any time, the price of pig iron were to fall below the cost of production.

Finally the following recommendations are submitted:

(a) To develop one or more of the best iron ore deposits and to make complete tests of the ore.

(b) To reserve a suitable water power for future development.

(c) To establish a plant for the economic production of charcoal from mill waste.

(d) To investigate the new process for the production of electric pig iron, and if this is found satisfactory to begin immediately to produce the pig iron; purchasing power for this purpose until the water power can be developed.

Prof. Stansfield was commissioned by the Hon. Wm. Sloan, Minister of Mines in the British Columbia Government, to investigate the conditions in this Province with respect to the electric smelting of its iron ores and to make the report thereon of which the foregoing is a brief summary. It is accepted as a clear exposition of the problem facing those ambitions to see the natural magnetite resources of the Canadian West exploited and, besides furnishing the Provincial Administration with valuable information for its guidance in the consideration of its policy towards this phase of industrial development, is expected to be of material help to private interests which have been considering the possibilities of an Iron and Steel Industry in the Northwest.

COAL MINE OPERATIONS IN WESTERN BRITISH COLUMBIA.

Discussing the coal mine operations in the western section of British Columbia, which includes Vancouver Island, during the year 1918, Mr. W. M. Brewer, Resident Government Engineer, states that there has been no abnormal progress, but that the advance has been steady despite the difficulty of obtaining capital and labor as well as the set-back sustained by the industry in the latter part of the year through the Influenza plague. "Wages", he says "paid to all classes of miners have advanced steadily during the year and to such an extent that many coal miners are receiving as much as $10.00 per day and upwards, and the minimum wage, since the last increase made on November I, is about $5.00 a day." He observes that there have been no labor troubles resulting in strikes in his district, although such were threatened, "but the questions in dispute were settled by conferences in which the employers, employees and Government officials participated." Continuing he states that "prospecting for coal has been carried out at the following localities: Near Chase River (Vancouver Island) by the Canadian Western Fuel Co., Ltd., on the Company's farm, Five Acres District, West Nanaimo, where the Wakesiah Mine is opened; near Craig's station on the Alberni extension of the E. & N. Ry. Co. by the Canadian Collieries (D) Ltd.; also at Wellington by the same Company, as well as by Mr. H. Shepherd and associates, of Nanaimo. The last mentioned drilling was done in the expectation of locating the old Well

ington seam at a point where it had not previously been worked, and as the operations were suspended by both outfits, it is presumed that the results were not satisfactory. Near the mouth of Chemainus River some foreshore leases were acquired by Messrs. H. W. Treat and associates, of Seattle Wn., and drilling was commenced at this point in December, 1918. A new discovery of coal outcroppings was made last Summer on the land of the Canadian Collieries (D) Ltd., on the Tsa-Abl River (sometimes called the Baynes Sound River) at a point about five miles up the river from its mouth. The company is opening up a road into the district in order to haul in and instal a diamond drilling plant to prospect the field this year." In the course of an enumeration of new mines which have been opened in the past twelve months and outlining new work done on old properties Mr. Brewer states that the Canadian Western Fuel Co. on the Wakesiah Mine has sunk an air shaft to coal on the Wellington Seam and connection has been made with the main shaft which reached coal at a depth of about 325 feet. The development of the property is proceeding and it is expected that an output of 500 tons of coal per day will be reached by about the middle of 1919. The estimated cost of the plant, railway connecting the mine with wharves and bunkers on the water front at Nanaimo, as well as initial development, is approximaticely $200,000. The new Mine of the Granby Consolidated Mining & Smelting Company at Cassidy's, Vancouver Island, which now has been opened by three slopes and is producing is not expected to be fully equipped with the plant proposed for about one and one half years. The estimated cost of the completed plant, including railway connection with the E. & N. Ry., coal washer, houses for staff, miners and workmen is approximately $1,000,000, when the capacity of the plant will reach about a quarter of a million tons of coal per annum. The maximum thickness of the seam is 12 ft.

The Granby Company, which has laid plans for a community at Cassidy's which in their provision for the housing of the workers will be the last word, has taken over direct supervision of the building from the new defunct Taylor Engineering Company. Many houses have been completed and in a few weeks twenty-five more will be finished, all of which are being modernly fitted. It is understood that about sixty others are to be constructed during the coming season as well as providing reading and recreation and pool rooms for the diversion of the employees. Dealing with development work on old properties Mr. Brewer states that the Canadian Western Fuel Company installed a new power engine (1,300 Killowatt D.C. generator) at the No. I. Esplanada Mine to replace the generator formerly in use. At the Harewood Mine the same company installed the following additions to the former plant: 1,200 Killowatt generator, two 150 h.p. boilers, and a new screening plant. The total estimated cost of these improvements is about $42,000. The Canadian Collieries (D) Ltd. carried on the following improvements at the No. 4 Mine, Cumberland, in the Comox District: Driven a new tunnel, the mouth of which is 15 feet higher than the entrance to the old slopes. The new tunnel is being driven directly over the old slopes and when completed will cut out the use of tail ropes to haul empties back from long flat from top of those slopes. A new tipple is being built at the same mine, with a Marcus screen installed in the tipple. The capacity of the plant is about 1,000 tons a day.

PRODUCTION OF COAL IN CANADA 1918.

The Department of Mines estimates the production of coal in Canada during 1918 upon the basis of monthly reports as approximately 15,180,000 short tons which was not only greater than production in 1917 by 1,133,000 tons, but was the largest production that has been obtained in Canada in any one year. The increased output of coal, however, has been derived almost entirely from the increased production in the Western Provinces, particularly Alberta. In Eastern Canada the production in the Province of Nova Scotia in 1918 was less than that of the previous year by about 337,000 tons and was the smallest production obtained in this Province since 1909. New Brunswick reached a higher production than in any previous year with an increase of 76,000 tons over a production in 1917. In Western Canada the Province of Saskatchewan appears to have produeed about 30,000 tons less than in 1917, while the increased production in Alberta was about 1,263,000 tons and in British Columbia 166,000 tons.

The production of 1917 and the estimated production in 1918 representing the actual amount of coal marketed or used and not including waste, slack, or unmarketable coal, are shown by Provinces herewith:

Coal Production in Canada.

	1917. Short tons	1918. Short tons.
Nova Scotia	6,327,091	5,990,000
New Brunswick	189,095	265,000
Saskatchewan	355,445	325,000
Alberta	4,736,368	6,000,000
British Columbia	2,433,888	2,600,000
Yukon	4,872	.....
	14,046,759	15,180,000

DEVELOPMENTS IN THE RICE LAKE DISTRICT, MANITOBA.

Since the discovery a few years ago of the Rice Lake gold-bearing area to the eastward of the southern part of Lake Winnipeg, the area has been considerably widened by the finding of gold in promising quantities in several adjacent areas. For a time the centre of chief interest, and still receiving a good deal of attention, is the area lying between Gold Lake and Clearwater Lake. The gold-bearing belt was found to extend still further to the east by the discoveries made in the Long Lake field. The latest discoveries meriting prominent attention lie in a northerly direction from the original Rice Lake area, to the north of the Hole River and in the vicinity of Hay Lake.

It will be well to follow custom and designate the whole gold-bearing field in this vicinity as the Rice Lake District and to indicate the particular fields in the order of their discovery and development:—(1) The Rice Lake Area; (2) The Gold Lake Area; (3) The Long Lake Area and (4) The Hay Lake Area.

During the past year, beyond some prospecting and assessment work, little has been done in the Rice Lake and Long Lake portions of the district.

On the Gold Pan claim, lying between Clearwater and Gold Lakes, development work on a small scale has been going on almost continuously. A shaft has been sunk to a depth of over 220 feet, and several short drifts have been run. It may be recalled that in an early stage of development some extraordinarily rich ore was encountered in the Gold Pan shaft. High-grade ore has been met in other parts of the shaft, and

in some of the drifts, while from the lowest part of the shaft as recently developed, come some very rich specimens.

The Provincial Government has an engineer engaged with a force of men in joining up the terminus of a winter road, constructed last year, between Fort Alexander and Gold Lake, with the Long Lake District.

Great interest has been shown recently in the developments on the Lulea Group of claims in the Hay Lake area, north of Hole River. The discovery was made by C. Andrews and for some time the claims were held by him and E. W. Jackson, of Winnipeg. Messrs. E. McDonald and C. M. Clark secured a controlling interest in the properties, which are held and operated by the Bellevue Mining Company.

The vein on the Lulea group is a quartz vein occupying a shear zone and carrying values in free gold and sulphides. Its width and length (from a few feet to twelve or more feet, and traceable across two or more claims) taken into consideration with the results of milling tests on sampled small-lots of ore, indicate that there is a sufficient quantity of good quality ore to warrant the considerable expenditure which the Bellevue Mining Company is making on the property.

Last winter an attempt was made by the operators to have some machinery taken into the district before the spring thaw; in this they were unsuccessful as the roads softened very early in the season. This machinery, consisting of a ten-stamp battery, an air-compressor and boiler, together with some supplies which were also stalled at Manigotagan last season, have been moved already to their claims.

As reported in the Winnipeg Free Press: "Forty-seven thousand feet of lumber has reached Manigotagan, as well as 25 tons of mining machinery purchased in the East. Another ten-stamp battery complete, together with some 150 tons of other machinery and fittings are now on the cars bound for Riverton, and will be rushed to the property.

"Everything will be run by electricity taken from the Winnipeg City Power Plant at Point du Bois." The Free Press also gives the information that there is a force of twenty-nine men working on the property and that the main shaft is down to a depth of 60 feet.

LIMESTONE FROM WINNIPEGOSIS.

Below is an average of three analyses of the high-grade limestone now being quarried near Winnipegosis by the Manitoba Gypsum Company for use in their manufacturing plant in Winnipeg:

	per cent.
Silica	0.41
Ferric Oxide	0.11
Alumina	0.20
Magnesium carbonate	0.66
Calcium carbonate	98.25
Total	99.63

SODIUM SULPHATE IN SOUTHWESTERN SASKATCHEWAN.

Winnipeg manufacturers are turning their attention to deposits of sodium sulphate occurring in Southwestern Saskatchewan. During the past year considerable interest has been taken in the search for potash deposits throughout the Prairie Provinces. Potash, as would be expected, has been found in many places but the low grade and relatively small quantity of these deposits make them at the present time look very doubtful as possible producers of potash salts. More abundant appears to be sodium sulphate and your correspondent is advised that important deposits of this salt with quality and quantity reasonably assured have been located in Southwestern Saskatchewan. There is a demand for this product in the pulpwood and glass industries. The former industry has been well established in Central and Western Canada and the latter may yet be an established industry in Manitoba when it is recalled that there are large deposits of glass sand available in the vicinity of Lake Winnipeg.

PRODUCING GYPSUM IN MANITOBA.

The Manitoba Gypsum Company, operating at Gypsumville and Winnipeg, has secured a considerable acreage on the shore of Lake Winnipegosis about six miles from the town of that name. The area is underlain by a high-grade limestone carrying 98.2 per cent of calcium carbonate together with small quantities of magnesium carbonate and argillaceous materials. It is the intention of the company to ship 1,000 tons of this material to Winnipeg during the coming year to be used in the manufacture of plaster, the Manitoba Gypsum Company being a large producer of a considerable variety of lime and gypsum plasters. The use of this raw material from a Manitoba locality is of special interest as hitherto the material which this production will replace, was imported.

Ore receipts in gross tons at the Trail Smelter of the Consolidated Mining & Smelting Company for the first week of 1919 aggregated 7,736.

Sales of Crown Granted Mineral Claims, which are in respect of taxes, are being advertised in different sections of British Columbia. Since the outbreak of the War the regulations in regard to Provincial dues have not been very rigorously applied, but from now on the authorities are likely to demand strict compliance with the laws. This, of course, does not mean that the terms of the Allied Forces Exemption Act which protects soldiers, sailors and their relatives while the former are on active service, are to be cancelled or in any way disregarded.

Kitelsas Mountain Copper Co.

A. J. Thompson, manager of the Kitelsas Mountain Copper Co., of Usk, B. C., is visiting Portland, Ore. to spend the holidays and to take up with members of the company plans for further development work in the opening up of the property. Discussing the results of the season's operations and the indications Mr. Thompson stated that there was a splendid surface showing and that, as far as work has been carried the outlook was promising. The ore is bornite containing copper, silver and gold and the veins, of which there were six, carried some free gold. To handle the latter it would be necessary to instal a mill and it was likely that this would be done before long. Four of the veins referred to were clearly shown on the surface. On driving a tunnel two others were cut which looked just as good. Five hundred feet of tunnelling has been done, including drifts. The original No. 1 vein had been cut, but did not show any great result. Drifting is being continued. A small shipment of ore had been made to the Tacoma Smelter and the result of its treatment would be waited with interest.

Special Correspondence

3 Grand Forks Furnaces in Operation.

Three furnaces now are in operation at the Grand Forks Smelter of the Granby Consolidated Mining & Smelting Company, and Superintendent Campbell expects that the Granby mines at Phoenix, B.C., will be able to ship sufficient ore to keep this number in operation continuously. It is stated that the fourth furnace may be "blown in" if ore shipping prospects warrant it. There is a supply of coke on hand and en route to meet the needs for a couple of months at least. Mr. Wakely A. Williams, superintendent of smelters for the Granby Company, who is responsible for the foregoing, also said that there was no immediate need of apprehension that the Grand Forks plant would be forced to close down. The price of copper, undoubtedly, would have an important bearing on the operation of Granby properties, and it might be necessary for production to be curtailed.

Queen Bess Mill Nearly Ready.

Mr. O. A. Thomas, manager of the Queen Bess Mining Company, reports that the concentrator being installed at that property is almost ready for operation. During the past eight months some $50,000 worth of machinery has been purchased in order to provide adequate equipment for the mine. The Queen Bess is a silver-lead-zinc proposition which was located in 1895 and which until a short time ago lay dormant. The steady development which has proceeded for the past two years has given the company a considerable ore reserve. A shaft sunk to a depth of 300 ft., Mr. Thomas says, proves the permanence of the ore bodies of the district.

The total ore receipts in gross tons at the Trail Smelter of the Consolidated Mining & Smelting Co. of Canada for the week from November 15th to November 21st inclusive, were 5,373 tons, making the year's total up to the latter date 294,922 tons.

Potash From Cement Plants.

At the request of the War Trade Board an investigation into the possibility of recovery of potash salts from the waste flue gas of cement plants is being undertaken in Canada. In the past Canada has produced small quantities of materials containing potash, not in any way meeting her demand for this valuable fertilizer, and it is thought likely that the by-saving what is wasted in the operation of cement plants the country may make at least a step towards independence.

Rich Silver Ore from Mary Reynolds Mine.

Some rich silver ore has been taken from the Mary Reynolds Mine, situated in the Stump Lake District, 35 miles east of Merritt, B.C. It is steel galena, and runs high in values. Specimens shown by Robert R. Hedley were taken from a drift at the 45-ft. level, where stoping is now in progress. The property has a shaft 100 ft. in depth, but Mr. Reynolds thus far has done work only on the 45-ft. level drift from this shaft. The vein at this point varies in width from three to five feet, the entire vein content being considered good milling ore, while some exceptionally high grade pockets are found. Development lower down will start at an early date. The vein, apparently a true fissure, shows on the surface at point about 900 ft. distant from each other. Open cuts at various points along the cropping expose the vein and ore is found in every opening.

Inland Mining Company.

The Inland Mining Company, of Walla Walla, Wn., has been operating the Eureka Mine, a copper property at Granite, B.C., in the Nelson Mining Division, for almost four months, during which period $15,000 has been spent on development. Production has been brought to 25 tons a day, the ore is being shipped to the Trail Smelter for treatment. Plans for further development include a long cross-cut tunnel and the construction of a tramway to the Canadian Pacific Railway. Mr. W. M. Meyers is superintendent at the mine.

Government Discontinues Prospecting for Platinum.

After the 31st of December no more platinum will be purchased at the Dominion Assay Office, Vancouver, B.C. This institution was opened during the latter part of the war for the purpose of encouraging the production of the metal in Western Canada, it being imperatively needed for war purposes. In this connection the placers of the Tulameen River were prospected by representative of the Imperail Munitions Board in Canada. The results of the latter work were satisfactory and indications were that, if development were continued as energetically as it started, a considerable quantity of platinum would be recovered. With the war over and the demand much lighter, operations by the Government on the Tulameen River have ceased. The Vancouver Assay Office was established to receive this platinum, as well as that recovered by companies or individual prospectors and operators throughout the Province, and also that of private individuals who cared to part with jewelry made wholly or in part of platinum. Payment was allowed, as soon as its value was confirmed, at the rate of $105 an ounce. While the latter arrangement will be discontinued by the new order, it is not believed to be the intention of the Canadian Government to withdraw the assay office, it being the opinion that it will be maintained for the benefit of prospectors and miners.

Coal Shortage on Pacific Coast.

The Alaska Bureau of the Seattle (Wn.) Chamber of Commerce and Commercial Club recently received an urgent appeal for a supply of fuel from the Territorial Council of Defence, Juneau, Alaska. W. A. Clark, chairman of the latter body, stated that there was only enough coal in Juneau at that time to last four days, and that none was to be found at Douglas City. As Juneau is in the Government Forest Reserve, no wood was available. Mr. Clark was told that the delay in despatching fuel to the North was owing to the fact that vessels of the Seattle-Alaska Fleet could obtain none in the Northwest. Since then, however, the freighter Latouche loaded 800 tons at the Pacific Coast Coal Mining Company's Bunkers, Seattle, and will discharge it at Wrangell and Juneau. It is feared that if shipments are not maintained more regularly there will be much suffering in the northern British Columbia and Alaska centres this winter.

Developing Gold Deposits on Proserpine, Mt., B.C.

The "Imperial" and "Independence" Group of Claims on Proserpine Mountain, a low rounded mountain situated just south of Barkerville in the Cariboo District, B.C., are showing up very satisfactorily as a result of recent development work. Present indications are that, properly handled, the properties will be made a productive gold mine. As far as the work has gone the veins are well defined and contain exceptionally good values. Whether, with further sinking, the condition will be found to continue is another question, but competent authorities are of the opinion that the chances are excellent. Williams Creek, which is adjacent, was one of the largest producers of the early placer mining days in the Cariboo and it is felt that, old story as it is, the owners of the claims in question are justified in believing that they have located one of the sources of the gold that was taken from the sands of the Creek bed.

Three years ago the first of the claims were located and called the "Independence." Shortly after eight claims were staked on the strike and named the "Imperial" Group. Since then prospecting has been carried on continuously on both, the work consisting of shaft sinking, cross-cutting and stripping, proving the continuity of the veins for a distance of 8,000 feet.

An account of the present situation from Barkerville, B.C., reads in part as follows:

"There apparently are too large main veins, about 300 feet apart, with a strike northwest and northeast. No. 1 vein appears to be about 28 feet wide and No. 2 about 14 feet. Nothing of a spectacular nature was discovered until August, 1918, when a number of openings were made on the "Independence" No. 2 vein. Here a remarkable body of ore was uncovered. Considerable free gold could be seen in the quartz and from the pan prospects it was evident that the veins which at this point was 14 feet wide would yield high values. Some of the holes were sunk 10 feet deep. Mr. J. D. Galloway, district government engineer, visited the property for inspection during the month of October securing sixteen samples and assay returns from the Department of Mines show an average value of $61.50 in gold per ton.

"About three weeks after the "Independence" discovery the owners of the Imperial group succeeded in tracing the vein north-westerly by following the strike and float some 4,000 feet. Here, by a crosscut, the vein was picked up again, with an average width on the surface of 9 feet. It yielded good pan prospects while clusters of free gold could be seen through the quartz. Mr. Galloway also visited this property. At the time the owners had made two crosscuts in the vein about 8 feet in depth about 500 feet further north. From the double crosscut Mr. Galloway took eight samples which yielded as follows: From a sample taken on the south side of the first cut, $6.10 from a 17-inch cross-vein, 15.25; from the north side of cross-channel, $24.30; from a sample of the sulphide in the bottom, 8 feet deep, $231.30; from adjoining cross-channel, south side, $16.40; from north side, across 9 feet, $28; grab sample, main dump, $21; grab sample, main dump, fine material, $11. From the single cut, Mr. Galloway took three samples, assaying as follows: Two cross-channel samples, $19.40 and $28; one of the sulphide, $112.40 in gold and $1.60 in silver per ton.

"Shortly before Mr. Galloway arrived a well-defined 20-inch cross-vein was discovered highly mineralized also carrying considerable galena. Assayed a sample yielded $16 gold and $8.30 silver. Since Mr. Galloway's visit the owners have built a shaft house and a 4 x 6 shaft to a depth of 24 feet 6 inches.

"The free gold values seem to increase to a depth of about 11 feet, when the ore commenced to go into an arsenical sulphide and at 15 feet all signs of surface oxidization disappeared. The vein widened from 9 feet at the surface to 12 feet at the 24-ft level with the dip slightly expanding both ways. The quartz apparently stands in seams or partings—mostly dipped and running with the vein. These seams are from about half-an-inch to an inch wide and are highly impregnated with arsenical pyrites, while the silica itself carries a fair amount of the pyrites. The owners have crosscut the vein at 24 feet and have taken a cross-channel sample from each side of the tunnel, which they have forwarded to the Mines Department for assay. Slow progress has been made sinking on account of the water, and work has been suspended for a time to allow it to subside."

To Investigate Smelter Rates.

It is announced that the first session of the Committee appointed to investigate the rates charged British Columbia Mine Operators for the treatment of their ore by the Consolidated Mining & Smelting Company at Trail, B.C., will be held on the 21st of January at Nelson, B.C. The personnel of this Committee follows: Mr. S. S. Fowler, Riondel, B.C.; Mr. Ivan de Lashmutt, Silverton, B.C.; and Mr. James Anderson, Kaslo, B.C. The British Columbia Government will be represented by Mr. A. G. Langley, Resident Engineer with headquarters at Revelstoke, B.C.

Crow's Nest Coal Miners Do Not Want Representation on Commission.

For several months the coal miners of the Crow's Nest Field have been working on the Single Shift System, a concession which was granted following the strike of last September, when the understanding was that a Royal Commission should be appointed immediately to make inquiry into charges that the mines of the district were unsafe to life while operated on the basis of two shifts to the twenty-four hours.

It now appears that the men, satisfied with present conditions, do not propose appointing a representative to the Commission, a course which, it was understood, they were to take, the personnel to be completed by appointees of the Crow's Nest Pass Coal Company and of the Minister of Mines. What course will be adopted as a result of this announcement is difficult to say; but it seems assured that the company will not be content to allow the situation to remain, because its management feels that two shifts does not affect the safety of the workings and that the continuance of the single shift very seriously affects the output and the returns of the property.

The decision of the men is explained in the following resolution adopted at a recent meeting of Gladstone Local Union (Fernie, B.C.) No. 2314, U.M.W. of A.:

"Whereas the result of Order 26 decreed that the mines at Coal Creek and Michel resume work on single shift for an indefinite period pending the report of a Royal Commission;

"And whereas our position is actuated by the question of greater safety of the mines only, it is then we view with great concern the probabilities of such a Commission, composed as it will be of men of lesser efficiency or repute in the mining world;

"And now whereas we, as members of Gladstone Local Union, did not seek or request that such expert services as that of the highest reputed authority on the

American continent, viz., G. R. Rice, of the United States Bureau of Mines, nor were we asked collectively or individually to give evidence as to conditions existing in this coal field, but such evidence was supplied exclusively by the Crow's Nest Pass Coal Company, and by the Department of Mines, nor were we informed of the conditions which led to the disastrous explosion at No. 3 Mine notwithstanding the fact that the Department of Mines had G. R. Rice's report of conditions on file, which report of conditions clearly shows the flash point should be reduced from 5.5 to 2.5 in those mines;

"And whereas, since the above mentioned disaster the withdrawal point has been changed from that of ½ inch cap to ¼ inch, which shows that the Department of Mines must have some faith in the Rice Report on which we based our argument;

"Now whereas all commissions that have been appointed to settle disputes between capital and labor have invariably been unsatisfactory to labor;

"Therefore be it resolved that we, the members of Gladstone Local Union, No. 2314 U.M.W. of A., absolutely refuse to take any part whatever in the aforementioned Commission."

Coal for Prince Rupert.

The securing of an adequate supply of coal at reasonable rates for the City of Prince Rupert, B.C., has been under investigation by the Council of that community. Mr. Nicol Thompson, Fuel Controller, was interrogated as to charges, and in his reply stated that it had been arranged when he visited Prince Rupert in October, 1917, that the price of coal should be made by the dealers at their wharf or shed, cost of delivery to be arranged with the purchaser. At that time it was figured that the price would be $10.50 a ton, but since then there had been advances,making the cast at the mines as follows: All coal mines on Vancouver Island, except the Western Fuel Co., $7.20 per gross ton; Canadian Western Fuel Company, $6.45 per gross ton. Mr. Thompson further explained that under the new regulations while the price at which a dealer might sell was not fixed, his profit was limited to 50 cents per net ton over all reasonable overhead charges. Mayor Gale, of Vancouver, wrote Prince Rupert that the retail price of coal delivered in sacks over the greater part of his City was $10.50 per ton of 2,00 lb. He added that Vancouver had the privilege under charter amendments secured two years ago to operate its own coal business, and it has actually supplied all civic and semi-civic buildings at actual cost, although the city has not gone into the coal business in the ordinary way. The Prince Rupert Council finally recommended the establishment of closed coal bunkers operating on a gravity system, in order to eliminate much of the labor now wasted in distribution; that coal be purchased by consumers in bulk as far as possible to avoid the extra 50 cents a ton cost for sacking; that a representative of the city be appointed to cooperate with the Provincial Fuel Controller for the regulation of supply and prices in the Northern District; and that Prince Rupert be given power under the Municipal Clauses Act to operate coal yards if it is found in the public interest that such a policy be adopted.

Will Develop Groundhog Anthracite.

The Groundhog Anthracite Coal Fields of British Columbia are to be developed according to responsible mining men. These deposits are situated north of the Hazelton District and contain eleven known commercial seams, aggregating about 68 feet in thickness. Interest in these measures is held by Sir D. D. Mann and the Lord Rhondda Estate. While active work was suspended during the war it is asserted that it will be resumed without loss of time.

International Coal and Coke Co., Ltd.

Mr. A. C. Flumerfelt, President of the International Coal and Coke Company, Ltd., with collieries at Coleman, Alberta, has issued a notice to shareholders requesting proxies for a change in corporation from the State of Washington to a corporation to be chartered under the laws of the Dominion of Canada. While the operations of the company are in the Province of Alberta, the company, being a United States charter, has to pay taxes in the United States, which are now costing between $1,200 and $1,500 per month, and as well pay taxes under the Canadian laws. By operating under the Canadian law the United States taxes will be eliminated. In view of the high prices the company is receiving for its product and development at the mine, together with the installation of by-product coke ovens, the company is enjoying considerable prosperity and is rapidly increasing its financial strength. Two dividends amounting to three per cent have been paid to the shareholders during the year.

Vancouver Chamber of Mines.

At the annual meeting of the Vancouver Chamber of Mines, which was held recently, it was decided that an international mining convention would be held in the Province, under the auspices of the organization, sometime during the year. Nothing was done as to the fixing of a date, but the consensus of opinion was that it was important that the assembly should be made thoroughly representative of British Columbia, and of the Pacific Coast States. Officers were elected as follows: Hon. President, Hon. Wm. Sloan, Minister of Mines; Hon. Vice-Presidents, Senator Shatford and Mayor Gale; President, A. M. Whiteside; Vice-President, Lieut.-Col. E. G. Prior, Victoria, B.C., and C. E. Cartwright; Hon. Treasurer, J. M. Ley; Executive, Messrs. N. Thompson, G. T. Hodge, R. H. Stewart, J. M. Turnbull, S. J. Crocker, G. S. Pettipiece, I. Thomas, S. N. Miller, J. D. Kearns, H. P. McCraney, F. E. Woodside, B. G. Hawkins, W. E. Bland, A. B. Buckworth and G. S. Eldridge.

As a result of a recent inspection of the Cassiar Crown Copper Company's property, situated on Grouse Mountain near Telkwa, B.C., it has been decided to drive a new tunnel about 90 ft., with a view to tapping the vein at about 75-ft. depth, drifting from there on the ore. This vein shows up strongly on the surface, being fourteen feet wide and traceable for a considerable distance. Should the present indications be confirmed by further development, the owners propose installing a modern plant for the handling of the output. The copper contents of the ore constitute its chief value.

Mr. W. M. Sutherland, well-known in British Columbia as a prospector and mining operator, died recently at Revelstoke, B.C. He was interested with Mr. J. B. Tyrrell, of Toronto, Ont., in the development of the Golden Wonder Group of Claims on Rocher de Boule Mountain near Tramville. In the early days the late Mr. Sutherland was engaged in mining in the Yukon where he first became associated with Mr. Tyrrell.

The Canadian Graphite Industry

(From Summary Report, Mines Branch, 1918.)

By HUGH S. SPENCE.

With the object of collecting data for a new edition of the Mines Branch report on graphite, published in 1907, and which has been out of print for several years, the writer visited the graphite mines and mills in the Provinces of Ontario and Quebec. The graphite occurrences in these Provinces constitute the source of supply of all the graphite that has been produced in Canada in recent years. All the properties lie within a radius of 150 miles of Ottawa.

An attempt to exploit graphitic shales near St. John, N.B., was made many years ago, and a production was reported from that locality by the Canada Paint Co., as late as 1896. These shales carry a very finely-divided, amorphous graphite: a grade which is only suitable for pencil making, paints, or foundry work. Similar graphitic shales are known, also, from various other places in New Brunswick, as well as from Nova Scotia.

In British Columbia, disseminated graphite is reported to occur at Alkow harbour, Dean channel, and near Harrison lake. A vein of amorphous graphite near Marysville, Cranbrook district, was examined by the writer in 1916, and was reported on in the Mines Branch Summary Report for that year. None of these graphite occurrences have been exploited to any extent, though a small trial shipment is reported to have been made from the Harrison lake property; and a shallow prospect pit has been put down on the Marysville vein. The latter is only 18 inches wide, and consists of a mixture of silicates and amorphous graphite, the carbon content being about 25 per cent.

The shortage of graphite experienced in the United States during the last three years has been caused by the greatly increased consumption in the crucible manufacturing industry; shipments of Ceylon graphite—which is the grade preferred for this work—being insufficient to supply the trade. The demand for flake graphite has resulted in a great increase in mining activity in the United States, and a brisk demand has been experienced for Canadian flake. In spite of this, however, the adverse conditions which have long hampered the graphite industry in this country still persist, and during 1917 only three companies operated at all steadily, there being nine mines, each equipped with a mill, that have been either completely idle or in only intermittent operation. Various causes have conduced to this state of affairs, among them being: (1) failure to devise a proper concentration process for the particular ore to be treated; (2) erection of mill without sufficient care being taken to establish the existence of an adequate ore-body, which sometimes resulted in ore having to be hauled to the mill from outlying pits, and (3) remote situation of the property, necessitating an expensive road-haul for fuel and supplies. In several instances, large expense was incurred in the erection of a mill out of all proportion to the size of the ore-body—as subsequently developed. The power-consumption alone, in such a mill, using as fuel, wood or coal, which has to be brought a considerable distance, is a factor that has conduced to the lack of success attending operations at certain of the properties. In this connection, it may be noted that of the two active mills running on disseminated flake graphite ore, one is using oil as fuel, and the other is operated by water-power.

The flake graphite occurs in disseminated form either in crystalline limestone (Haliburton and Hastings counties, Ontario) or in more or less calcareous bands intercalated in gneiss (Buckingham district, Quebec), the latter ore as a rule carrying more graphite (10-15 per cent) than the limestone, which averages 7-10 per cent. Both varieties of ore carry flake mica, pyrite, pyrrhotite, and lime silicates, as the principal accessory minerals; and both have been treated by essentially similar concentration methods. These are, briefly, drying in wood-fired kilns; reducing in gyratory crushers followed by two or more sets of heavy rolls; and subsequent alternate screening and crushing in rolls of the flour-mill type. Each set of rolls eliminates gangue by reducing the brittle calcite and silicates to powder, while the soft graphite tends to flatten out and is caught by the screens. The produce from the final set of rolls is sometimes polished between buhr-stones, or goes to an electrostatic machine, which removes any remaining impurities, particularly mica; the latter is one of the most difficult minerals to get rid of, owing to its softness, and consequent resistance to crushing. In the early days of the graphite industry, a wet process of concentration, employing buddles, was practised. This method is still in use at one mill, as the initial step in concentration, followed by drying; the dried product then proceeding to rolls, screens, and buhr-stones.

One of the most recently constructed mills practises wet concentration by means of tables and hydraulic classifiers, followed by drying in a vacuum filter and kiln, and polishing between rolls. Good results are obtained in some mills, also, by the use of dry tables.

Concentration by means of water flotation, such as is in general practice in the mills of Alabama, U.S.A., is not employed at any mill in Canada.

While certain of the mills achieve a fair recovery of the graphite contained in the ore treated, the majority lose an undue percentage in the tailings. The concentration methods in general use are far from being efficient. In addition to poor recovery, the carbon content of the best, or No. 1 product, is seldom brought over 90 per cent, and is generally lower; a great deal of the flake in the rock is broken up in the milling, and goes into the smaller mesh No. 2 product, and to the No. 3 or dust; while the large amount of dust produced in the mill in grinding the kiln-dried ore is very objectionable. Screen tests on samples of No. 1 flake from seven mills showed the mean percentages of different size flake composing this grade to be as follows:—

+ 20 mesh	1.76	per cent.
+ 40 mesh	18.56	”
+ 60 mesh	67.00	”
+ 80 mesh	8.06	”
+ 100 mesh	1.10	”
— 100 mesh	2.96	”
	99.34	”

Most mills produce three grades of graphite, known as No. 1 flake; No. 2 flake; and dust. The No. 1 flake goes principally to the crucible trade; No. 2 is employed in lubricating products; and No. 3, or dust, is used in foundry work.

The graphite particles employed in crucible manufacture are required to be of a certain size, in order to bind efficiently with the clay. In this connection it may be noted, that one of the reasons for the preference for Ceylon graphite for use in the manufacture of crucibles is, that this variety does not occur in thin flakes like the American graphite, but is more massively crystalline, and breaks up on crushing into more angular fragments, hence requires less clay as a binder.

OBITUARY

M. W. SUTHERLAND.

On the 3rd of January last Murdoch W. Sutherland Miner and Prospector, passed away quietly in Dr. Winch's hospital at Hazelton, B. C.

Born in Western Canada of Scottish parents, his childhood was spent on a farm near Edmonton in Alberta and when but a young man he spent a year or two at Jasper House on the Athabasca river, trapping fur-bearing animals, and trading for furs with the Indians.

When gold was discovered in the Klondike he was one of the first to cross the mountains to the new Eldorado. After his arrival in the city of Dawson he spent some months prospecting for himself, and then engaged with Mr. J. B. Tyrrell on Hunker Creek first as miner and subsequently as foreman. Afterwards he took a lay on one of Mr. Tyrrell's claims and worked it carefully and economically with a fair measure of success.

About 1904 or 1905 many miners left the Klondike for the new diggings near Fairbanks in Alaska and Sutherland was one of the number. There he worked a lay on a claim on Cleary Creek, and through his force of character and ability in handling men, and with the experience in placer mining gained in the Klondike, he was so successful that he realized a small fortune. Then others recognized his efficiency as a manager, and made him flattering offers if he would

THE LATE M. W. SUTHERLAND,
In camp north-east of Hazleton, B. C.

undertake to manage their properties, but he loved independence and now that he had money at his command he decided to visit South America and examine some of its placers. Not finding anything attractive there he returned to Edmonton, his old home, where he engaged in the grain business for a short time.

From there he turned to Northern British Columbia where most of the remainder of his life was spent prospecting in the mountains and developing some of the prospects that seemed most attractive to him.

He belonged to that rare type of independent fearless men who love the forests and mountains and are at home anywhere in the wilderness, but who at the same time must always be engaged in active work of some kind, and whose chief joy is in discovering and developing the resources of the wilderness and making it contribute to the needs of civilization.

He was gifted with keen sight, and having a clear enquiring mind he was a careful and accurate observer. Self-reliant in the face of difficulties he had learned that by immediate attention and hard work he could overcome almost any obstacles that might present themselves, and being strong and tireless he did not know the meaning of rest, except as a preparation for more work.

Almost energetic either at work or play, he had no sympathy for men who were idling their time away, either in the wilderness under the name of prospectors, or in the mines under the name of miners. Nevertheless, he was one of the kindest of men, and if a man was doing his best, however poor that best might be, he was ready to assist him, and if a man was in distress he was anxious to help him. In fact, he would give his last dollar to anyone whom he knew to be really in need. From his own experience and observation he knew how much work a man should be able to do, and men working for him knew that he knew, so that he had no difficulty in obtaining willing and efficient labor.

Such men as Sutherland can ill be spared in Canada where honesty, intelligence, strength and fearlessness are the main elements of success.

Personals

Mr. R. J. Ennis, manager of the McIntyre-Porcupine mine went to Toronto on business, early in the week.

Mr. W. E. Simpson, consulting engineer for the Miller Independence is in Sherbrooke, Que., on business.

Mr. B. E. Neilly, of Cobalt, will be elected vice-president of the Canadian Mining Institute for the coming year.

Mr. A. Wende, manager of the Wright-Hargreaves mine, of Kirkland Lake has returned to Buffalo after a business visit to the mine.

Mr. Harry Stewart, manager of the Crown Reserve mine is in Montreal this week, where he attended the annual meeting of the company, held on Wednesday.

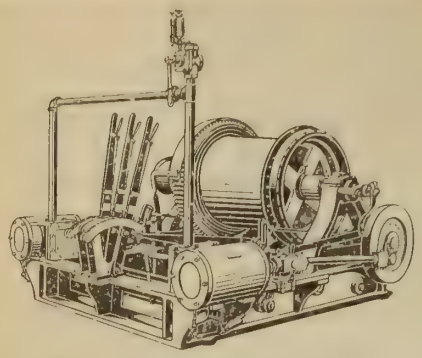
Mr. S. G. Blaylock, assistant general manager of the Consolidated Mining & Smelting Company of Canada, has returned to Trail after a business trip to the East.

Thomas Goard, a pioneer prospector and miner of the Revelstoke, Illecillewaet, Slocan and Lardeau Districts of British Columbia, died recently at Revelstoke.

Mr. Harry Oakes, president of the Lake Shore mine, went south early in the week to attend the annual meeting of the Tough-Oakes Gold Mines, held Wednesday in Toronto.

The following will be elected by acclamation councillors of the Canadian Mining Institute: Robert A. Bryce, Toronto; Geo. Gillespie, Madoc; E. T. Corkill, Copper Cliff; C. E. Smith, Ottawa.

Mr. George J. Miller, president of the Miller Independence mine at Boston Creek went south to Dayton, on Wednesday, and while there will attend the annual meeting of the company to be held early in February.



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U. S. MINERAL OUTPUT.

The value of the minerals produced in the United States in 1917, according to the United States Geological Survey, Department of the Interior, was $5,010,948,000, an increase of $1,496,976,000, or about 43 per cent, over the former record—$3,513,972,000—established in 1916. The blast furnace products (pig iron and ferro-alloys), copper, coal, and petroleum contributed 74 per cent of the total value of minerals produced and 88 per cent of the increase in 1917.

The metals established a new record in 1917, being valued at nearly $2,092,000,000 and representing 42 per cent of the total value of the mineral product. They showed an increase of about $471,316,000, or 29 per cent, over the $1,620,508,000 reported for 1916. The blast furnace products contributed nearly 90 per cent of the total increase. Increases were also made in the value of aluminum, copper, lead, and silver, but decreases were recorded in the value of gold and zinc.

The value of the non-metallic products in 1917 was 58 per cent of the value of all minerals produced, increasing $1,010,459,000, or nearly 54 per cent, from the former record of $1,878,464,000 in 1916 to $2,888,923,000 in 1917. Of this total increase coal alone represented nearly 66 per cent, and coal and petroleum combined contributed about 85 per cent.

Dr. C. K. Leith, head of the Department of Geology in the University of Wisconsin, and well known in Northern Ontario, recently sailed for France to act as Mineral Adviser for the United States Peace Commission.

The Canadian Wire & Cable Co., Ltd., is installing machinery for the manufacture of a full line of wire rope in the plant at Leaside. It will be in operation March 15th. The company will then be in a position to supply all kinds and sizes of steel wire rope.

Mr. Elwyn G. Blacklock, assistant general manager of of the Consolidated Mining and Smelting Company of Canada, and Miss Kathleen Riddle, of Danville, Quebec, were married on Tuesday, December 31st last at the Congregational Church, Calgary, Alta. Mr. and Mrs. Blaylock will reside at Trail, B.C.

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1 12-in. x 15-in. two-drum Jenckes Tandem Hoist, with one 20-in. auxiliary drum and one nigger-head mounted on the shaft extension. Second-hand, but in good condition.

1 Steel Mast, 11 x 17 inches, 45 or 60 feet long, equipped with all sheaves, foot castings and swivel top piece for 12 guy wires.

1 1 cu. yard Mansfield back dump Excavator Bucket, second hand.

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EDITORIAL

MINING ENGINEERS AND WAR WORK.

The part that mining engineers have played in the war is well indicated by an article by Mr. F. F. Sharpless in a recent number of the "Engineering and Mining Journal." Aside from the work of producing the raw materials for munitions, the mining industry has furnished men for many important duties, besides those that are purely military. Needless to say, mining engineers and miners have proven to be excellent and versatile soldiers and transportation officers. They played a big part on the battlefields in France and Belgium. Used to hardships and to overcoming difficulties promptly as they present themselves, they were not easily disconcerted. On the firing line and behind it, in tunnelling and in transportation, they helped to make the Canadian army second to none.

At home as well as at the front, mining engineers have distinguished themselves. Chief among these is Herbert C. Hoover, an American mining engineer, who was in London when war broke out. The story of those days is told by Mr. F. F. Sharpless, who writes:

Upon the declaration of war between Germany and the Allies, the chaotic situation produced among the tourist population, which we may now recall with some mirth, developed almost over night. London found herself the rather unwilling harborer of many a shipwrecked traveler, men and women without home, food, shelter, or friends, and with nothing in their pockets that resembled real money. Willing as they were, the American consulates and the Embassy found themselves overwhelmed with the care of a disorganized horde of scared women and brainless men. The American Ambassador, in this emergency, thought of an American, well known in London for his capacity and executive ability. He called up H. C. Hoover and asked if he would lend his assistance. He would; and within a few hours Hoover had organized a force, the members of which were busy in financing and moving, in orderly manner, this crowd of lost or strayed Americans.

"Hoover was a mining engineer; his relief organization was chiefly of engineers, most of them mining engineers. They were selected not *because* they were mining engineers; they were selected because they had had experiences fitting them for handling any sort of unexpected human, physical, or financial trouble. Many of them had themselves been stranded, lost in darkest Africa, near death's door in half a dozen places, and had tackled and handled successfully much worse situations than the feeding and shipping of a lot of stray sheep in a place where there was plenty of food and lots of shipping. Hoover's assistants were chosen for their ability; it only happened that they were nearly all mining engineers.

"This work having been finished so successfully, it was only a short time until another big organization problem presented itself, one of vast proportion and of complications scarcely conceivable at its inception—the relief of the Belgians. Without a moment's question this stupendous task fell to Hoover, the mining engineer—a task involving problems of commerce, finance, and diplomacy all conducted under most unfavorable conditions. Again Hoover called for suitable help, and again he found it largely among the mining engineers, men who had met unexpected situations and acquitted themselves with credit. An English critic of the work describes it as "the formation of the largest and most successful grocery business in the world, and it was done in less than six months." This success in Belgium was in no way due to official support from the United States. Indeed, not only were moral and financial support lacking from our Government, but the members of the commission were instructed to get out of the country, instructions that were reluctantly and slowly followed."

We need not dwell further on Hoover's work; it is too well known. As most of our readers well know, the mining engineer is very often in a position where he must provide for the wants of large numbers of men in places and under conditions that would discourage most people. He has often to be a pioneer and then the father of a large community. He soon learns to take more interest in humans than in machinery. Consequently we were not surprised, though very pleased, when we learned of Hoover's work. Nor were we much surprised to read in the newspapers this week that Col. J. W. Boyle is in charge of the work of feeding Roumania, and that he is arranging to purchase food in Canada. Col. Boyle is president and manager of one of the biggest gold mining concerns operating in the Yukon.

Next to feeding the starving, one of the duties of most human interest is that of caring for disabled soldiers. Here too we find mining engineers taking a large part. The difficulties confronting those who took up this work in Canada attracted the attention of a Canadian mining engineer, Mr. W. E. Segsworth of Toronto. Mr. Segsworth's endeavor to assist returned men to qualify themselves for good positions in industry and to see that they were given preference by employers, led to his being appointed Administrator of Vocational Training. During the past two years he has devoted all his energies towards helping the re-

turned soldiers, especially the disabled. As a result, he has seen the Vocational Training work in Canada develop into one of which the country can well be proud. The story of this work has not yet been widely told; but those who are close to it know that in this, as in the battlefield, Canadians are leading the advance. Mining men are naturally pleased to see that a mining engineer is taking such a large part in this work. Needless to say, he has among his helpers many mining men. His chief aid in Ontario is H. E. T. Haultain, who is professor of mining in the University of Toronto, and who devotes about twenty hours a day to his work as Vocational Training Officer for Ontario. Like Mr. Segsworth, he receives no salary. Those of our readers who attended the National Exhibition in Toronto last September and saw the exhibit put on by the Department of Civil Re-establishment, will have some idea of the earnestness of the soldiers who are being helped to get back into civil life by such men as Segsworth and Haultain. We look forward to seeing similar assistance given by the Government to disabled men of all classes. These mining engineers will not be satisfied when they have returned to industry all disabled soldiers. They have started something that will doubtless result in more thorough training for industry of all classes of young men. We may be pardoned for claiming that the mining industry is contributing something besides minerals and metals to Canada's welfare. Segsworth and Haultain are doing work of very praiseworthy character, and they are accomplishing much more than is yet generally known.

THE RELATION BETWEEN IGNEOUS ACTION AND CRUST MOVEMENTS.

There are few who are so well qualified to write on the subject of igneous activity and igneous rocks as is Dr. Alfred Harker. There has recently been brought to our attention a copy of Dr. Harker's presidential address delivered at the anniversary meeting of the Geological Society of London, last year. He discusses particularly igneous activity as recorded in the rocks of Great Britain, and he does not dwell on the economic importance of his observations. His remarks contain, however, suggestions that may assist in the unraveling of the history of ore deposits, and thus give some assistance to those who search for ore.

In his address, Dr. Harker devoted his attention particularly to the relation between igneous action and crust-movements. In the study of the structural features of ore deposits there has been a tendency to deal with these phenomena as independent. As Dr. Harker points out, "the link connecting these two classes of effects is found in. The consideration that both afford relief to the unequal stresses which are continually being set up in the earth's crust by causes regional as well as cosmic."

Dealing particularly with observations in the British Isles, Dr. Harker states that the whole geological history of Britain can be viewed in relation to three cardinal events—the three systems of crust movements which at widely separated epochs contributed largely to the building of the country. "Each great system of crust movement has been attended by a display of igneous activity, related to it in a manner which clearly bespeaks some underlying law of causation. There is in each case evidence of extensive platonic intrusion within the disturbed area, either at the crisis of the disturbance, or following it after no long interval by geological reckoning. These copious intrusions of magma, no part of which reached the surface, are not only events of the first magnitude, but seem to differ functionally from the igneous action which characterizes other stages of the cycle. This more diffused activity, taking the form of extrusion as well as intrusion, is developed during the gathering of crustal stress before the critical epoch, and again especially in the later waning stages. It has many features suggesting that the several episodes which can be distinguished have their proper places in an ordered sequence. When there has been igneous action during a season of relative quiescence, this, too, has its own significant characteristics. . . . We shall not, however, appreciate fully the relation between igneous action and crustal stress, unless we have regard also to the petrographical facies of the rocks erupted at different phases of a complete cycle. It is becoming increasingly evident that magnetic differentiation is closely bound up with progressive crystalization, the essential factor being a separation, or partial separation, effected between the crystaline and the fluid portions at one stage or another of the process."

In support of his hypothesis that "the distribution of crustal stress is a dominant factor in determining the petrographical facies of igneous rocks," Dr. Harker gives a brief survey of igneous activity in Britain. He endeavors to show that, at different periods of its history, that area has been differently mapped out into petrographical provinces, and this in a manner quite definitely related to the larger displacements of the earth's crust.

Of peculiar interest to Canadians are Dr. Harker's observations on the pre-Cambrian rocks. He says of the oldest rocks in the Scottish Highlands: "The rocks are of calcic facies, like all other rocks intruded in close connection with powerful lateral thrust. In the South-Eastern Highlands especially it is clearly seen that the earliest intrusions of magma preceded the climax of the disturbance, so that the basic members of this rock-series met the brunt as rocks already solid; while the later and more acid magmas were intruded near the height of the mechanical disturbance and during its decline."

The average reader will be little interested in Dr. Harker's address, and some may wonder why we have devoted space to it here. We do so because we believe that Dr. Harker's work is likely to be of no little value to those who study the geology of our ore bearing areas. He sees order and sequence where the average observer sees only a complicated assemblage of rocks. Many of

our ore deposits are in pre-Cambrian areas, in rocks whose history it is not easy to decipher. Dr. Harker's words suggest that a fuller understanding of the geology of pre-Cambrian areas will come with research. When the larger geological features are better understood we may expect to read more accurately the history of our ore deposits. When this is possible we will have more reliable guides for those whose work it is to find ore. We wish Dr. Harker every success in his researches. He has remarkable ability in interpreting the history of rocks, and if he continues to work along the lines indicated in his address, we may reasonably expect him to offer many suggestions that will help and encourage his fellow workers and which will eventually be of value in the development of our mineral deposits.

REPLACING COKE BY COAL.

In this number we published an article by Mr. W. L. Wotherspoon on the experimental work in connection with the use of powdered coal in blast furnaces. The work at the Copper Cliff smelter is likely to prove of international interest. Owing to the constant demand for metal, it has not been possible to interfere very much with the steady operation of furnaces, and the experiments are not yet completed. Sufficient success has, however, been attained to warrant the claim that another big advance in metallurgy has been made.

ANNUAL MEETING, A. I. M.E.

International co-operation in mining in North America will be one of the principal topics to be discussed at the 119th Meeting of the American Institute of Mining Engineers, to be held in New York, February 17th to 20th. In the course of the Convention two joint sessions with the Canadian Mining Institute and one joint session with the American Institute of Electrical Engineers will be held. A number of prominent members of the Canadian Mining Institute will be present.

Improving the relations of capital and labor and the possibility of a uniform mining law for North America will be among the principal subjects which the Canadian engineers will discuss with the American Institute. Many of these topics will deal with after-the-war problems of great significance to American business. Three of the four days of the Convention will be devoted to business and technical sessions with entertainment features in the evenings, and the fourth day will be given over to an excursion to the Federal Shipyard at Newark Bay, where the first electric-welded ship is being built. The subject of electric welding is one of the principal ones to be taken up by the American Institute of Electric Engineers in joint session with the mining engineers on Wednesday, February 19th.

Some of the social features of this year's meetings will be: An evening entertainment; visit to the Metropolitan Museum of Art and Senator Clark's Art Galleries; a Matinee; a Reception of the President and the Annual Banquet.

REPORT OF ADVISORY COMMITTEE IS CRITICIZED.

Vehement condemnation of a report credited to the British Columbia Advisory Committee for Scientific and Industrial Research regarding the possibility of the successful establishment of an iron and steel industry in this Province is contained in the daily press and in the comments of public bodies. The report's general conclusion is that there is room for one large plant provided that it is assured of the whole Pacific coast market, but that conditions of manufacturing and market preclude under present conditions the establishment of more than one plant. But the report is also quoted as saying—and this is what is vigorously objected to—that "there does not seem to be, however, much likelihood of the iron and steel industry ever being developed on the Pacific coast to any large extent." In view of Dr. Alfred Stansfield's finding that there apparently is plenty of magnetite ore of the necessary purity for use in electro-smelting; in view of the special interest which the Provincial Government and Hon. Wm. Sloan, as Minister of Mines, is taking in the development of the iron ore resources of the Province; and in view of the general feeling among the business men of British Columbia that the initiation of an industry which will utilize the iron deposits now idle, and which while as yet unexplored are believed to be very extensive, it is felt that the latter statement in particular is absolutely unjustified. At a recent meeting of the Vancouver Board of Trade one of the members of its Council, Mr. George Kidd, who also is a member of the Advisory Committee for Scientific and Industrial Research for British Columbia, was requested to furnish information on the investigation conducted by the committee with regard to the establishment of an iron and steel industry in British Columbia. The report, in the opinion of members of the Council, was not in keeping with the facts as disclosed by investigations made by mining experts. A Vancouver newspaper wants to know who the members of the Advisory Committee are, and by what right it undertakes to say that "there is not much likelihood, etc." It adds: "Surely it is not the business of government employees to go out of their way to gratuitiously belittle the prospects of any section of the Dominion."

May Develop Copper Deposits on Ecstall River.

Reports are current that the Granby Consolidated Mining & Smelting Company proposes to develop the copper deposits of the Ecstall River, Northern British Columbia, which were prospected last season, and which are said to be most promising, on quite an extensive scale. Rumor has it, and it is given for what it is worth as such, that the company contemplates establishing a smelter at some point on the sea coast opposite the aforementioned deposits, and that a route from the property to the suggested site has been surveyed.

Mr. N. J. Everett, former manager of the Porcupine V. N. T. Mine of Porcupine, has taken over the management of the Davidson gold mine, succeeding D. Sloan, who, for a considerable time, managed the Davidson.

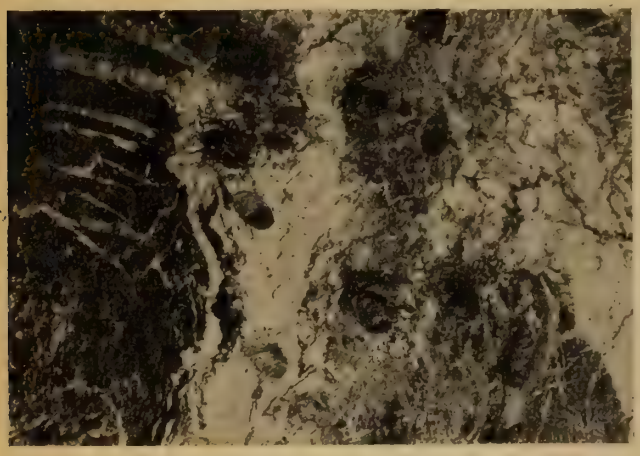
Larder Lake Gold Area

By PERCY E. HOPKINS.*

During the first week in October, 1918, the writer examined the working properties at Larder Lake. Since little has been published recently on the area, a brief history and geological summary of the camp may not be out of place. The properties, which are being worked, and a newly-discovered pyrite deposit, will be described, and mention will be made of the hydro-electric development.

History.

Larder lake lies 18 miles by wagon road east of Dane station at mileage 160 on the Temiskaming and Northern Ontario railway. The finding of gold at Larder lake in August, 1906, by Dr. Reddick, caused a rush of prospectors to the area during the following winter of 1906-07, when a few thousand claims were staked. The Larder Lake Mining Division was formed, and J. A. Hough appointed Mining Recorder at Larder City in June, 1907. Development following the "winter stakings" resulted in much disappointment, as is often the case, and finally most prospectors left the area, and the recording office was moved, in March, 1911, to Matheson. Desultory mining has been carried on at two or three properties since. The total gold production is in the neighbourhood of $25,000, coming from the Associated Goldfields (Harris-Maxwell), Mine d'Or Huronia and Reddick.



Face of Drive on 500 ft. level, in ore containing visible gold. Harris-Maxwell property, Associated Goldfields, Ltd.

Gold Bearing Quartz Stringers in Dolomite.—Open pit on Harris-Maxwell property. Associated Goldfields, Ltd.

Literature.

In 1901 Willet G. Miller,[1] Provincial Geologist of Ontario, passed through Larder lake, then called Lake Present. In 1903, W. A. Parks,[2] of Toronto University, described the geology along the chief waterways of the area. In June, 1907, R. W. Brock,[3] who afterward became Director of the Geological Survey of Canada, examined and reported on an area in the vicinity of Larder lake for the Ontario Bureau of Mines, this report being accompanied by a geological sketch map. His assistant, N. L. Bowen,[4] continued geological work during the remainder of the summer and published a more detailed map and a brief report. M. E. Wilson,[5] spent 1908 and 1909 in the area, and published detailed maps and reports. In September, 1915, A. G. Burrows[6] examined La Mine d'Or Huronia and a part of Gauthier township.

Geology.

The geology of Larder lake is similar to the pre-Cambrian in many other parts of Ontario. The oldest rocks are dominantly volcanic and consist of greenstones and green schists. Associated with them are sedimentary bands of ferruginous carbonate, iron formation, slates, and conglomerate, with an almost vertical dip, which have their greatest development along the north shore of Larder lake, and are traceable westerly to Kirkland lake. The rusty-weathering carbonate is intersected by quartz and calcite stringers which carry most of the gold in the area, and hence will be mentioned in greater detail. Cutting the above rocks are porphyry and aplite tongues, presumably from the large granite batholith to the southeast. Resting unconformably on all these rocks are erosion remnants of conglomerate, greywacke and arkose of the Cobalt series. The diabase and gabbro dikes represent the latest ingenous activity, and are the youngest rocks of the area.

Rusty-weathering Carbonate (Gold-bearing Formation.)

Rusty carbonate rocks are found in or near many of the gold areas of northern Ontario. They are, however, more widely distributed in Larder lake than elsewhere, and important since they appear to contain a greater quantity of gold than the other rocks of the area. Gold, however, does occur in aplite on the Gold King, and in the porphyry and green schists of La Mine d'Or Huronia. Hence it is believed that the gold is related to these aplite-porphyry intrusions and, therefore, indirectly to granite. These rusty-weathering carbonates are in places dolomites which occur in bands up to 300 or more feet in width. They

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*Geologist, Ontario Bureau of Mines, Toronto.

[1] Lake Temiskaming to the Height of Land, by W. G. Miller, Ont., Bur of Mines Report, 1902, pp. 214-230.

[2] The Geology of a District from Lake Temiskaming northward, by W. A. Parks, Summary Rep. G. S. C., 1904, pp. 198-225.

[3] The Larder Lake District, by R. W. Brock, Ont. Bur. of Mines Report, 1907, pp. 202-220.

[4] Ont. Bur. of Mines Report, 1908, pp. 10-11.

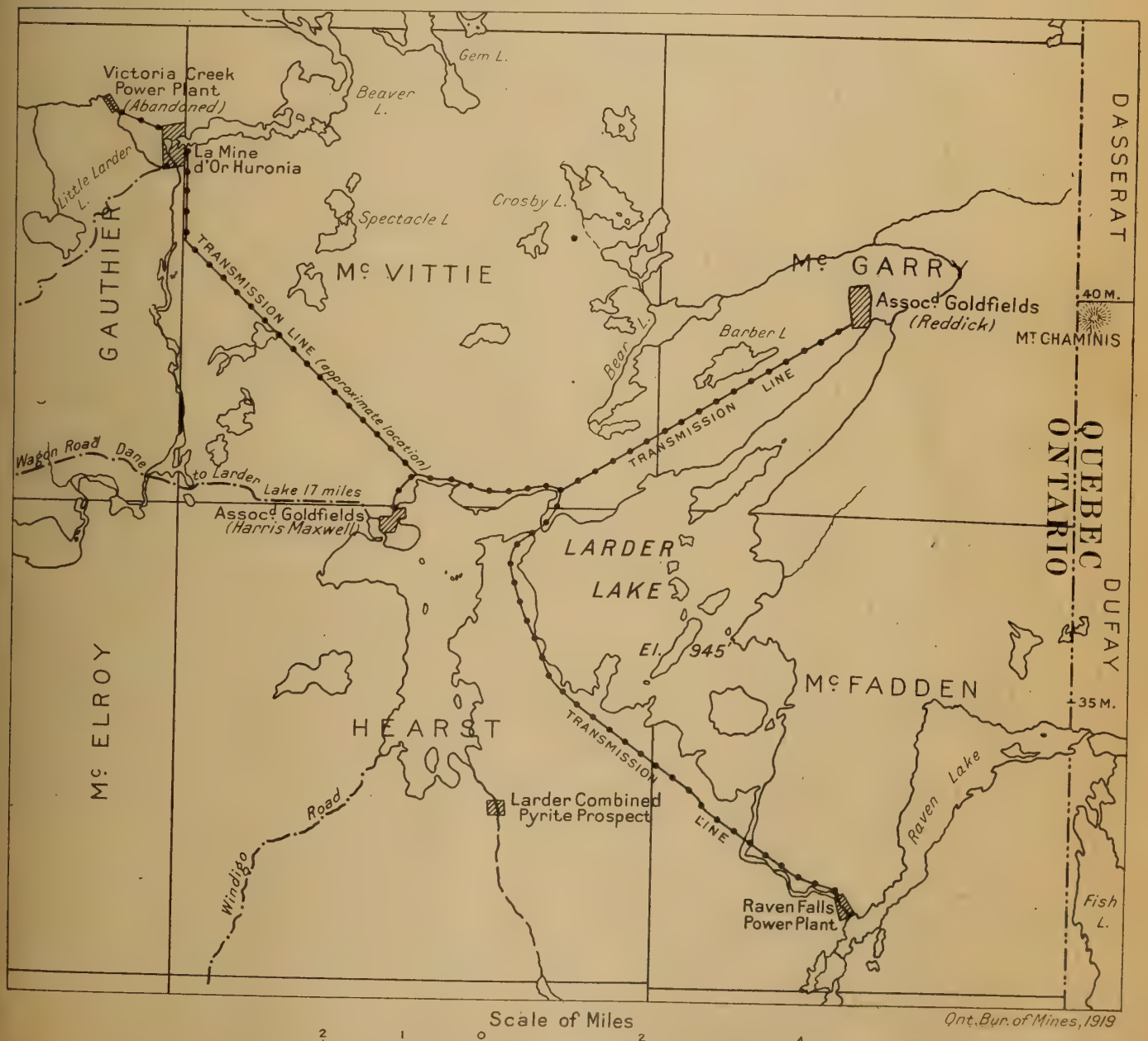
[5] Larder Lake and Eastward, by M. E. Wilson, Summary Report Can. Geol. Surv., 1909, pp. 173-179. Geology and Economic Resources of Larder Lake, by M. E. Wilson, Memoir No. 17-E. Can. Geol. Surv., 1912.

[6] Gold in Gauthier township, by A. G. Burrows, Ont. Bur. of Mines Report, 1917, pp. 252-257.

are usually brown in color, but often large parts of them have been altered to green fuchsite or mariposite, serpentine and talc. They are intersected by a network of quartz and calcite stringers, which in places carry low gold values over wide widths, and frequently small ore shoots or spectacular gold showings. Although this association of rocks and mineral solutions does not form ore in many parts of the world, still it resembles somewhat the ore bodies on the Rawhide mine, southeast of Angels Camp, California. Small, medium-grade ore shoots do occur, as on the 83-ft. level of the Reddick and 500-ft. level of Harris-Maxwell, but they are isolated, with little to indicate where they will be found, and what will be their extent. The passing from ore into barren material is known only by the disappearance of visible gold and low assay values, and not by a charge of formation. Since the known richer shoots are small and scattered the success of mining will depend upon the working of a large tonnage of low-grade ore, which will necessitate much capital and very detailed mining. Electric power being available, a careful systematic surface sampling can be made of large areas of mineralized dolomite at a reasonably small cost, with the view of locating low grade ore over considerable widths. Air pipes could be extended across such areas, and hand plugger drills used to sample the dolomite at an inch or so below the oxidized surface.

Associated Goldfields.

The Associated Goldfields Mining Co., Ltd., is operating Block "B" and Block "D" formerly known as the Harris-Maxwell and Reddick respectively. Power is supplied from their own hydro-electric plant at Raven falls, all three properties having telephone connection. In addition the company has a telephone line to Dane station. The president of the company is Geo. A. Mackay, with head office at 306 C.P.R. Building, Toronto. C. G. Dampreé is general superin-



The Larder Lake Gold Area.

tendent, and D. A. Anderson electrical engineer. The writer is indebted to these gentlemen for courtesies extended him.

Raven Falls Hydro-Electric Power Plant.

The power station is situated on Raven lake, at the entrance of Raven river. Larder lake serves as a storage basin. The water is fed by a flume 6 ft. in diameter and 1,280 ft. long, and the turbines operate under a head of 6 feet. According to A. R. Webster, Mining Inspector for Ontario Bureau of Mines, two horizontal turbines of 800 H.P. each run two 700 K.W. generators. The voltage is stepped up from 2,400 to 13,200 through three transformers of 300 K.W. each. Power is then transmitted 7¾ miles to "the Narrows" on Larder lake, where the line divides, one branch going 4½ miles northeasterly to the Reddick and the other 2½ miles westerly to Harris-Maxwell and an additional 5½ miles northwesterly to La Mine d'Or Huronia, making in all about 21 miles of transmission line (three phase, sixty cycle) as shown on the accompanying sketch map. At the Reddick the voltage is stepped down to 2,200 through two 150 K.W. transformers. Here a 225 H.P. motor drives a compressor of 2,000 cu. ft. capacity. The branch line to the Harris-Maxwell is stepped down through two 75 K.W. transformers to 550 volts. On the property there are various motors for driving the different pieces of machinery. Power was supplied for a time for the running of the mill on La Mine d'Or Huronia. The latter had a small electric plant of its own on Victoria creek, but it was closed owing to lack of storage capacity.

Block "B" Associated Goldfields (Harris-Maxwell).

This property consists of two claims, H.S. 114 and 115, on the northwest shore of Larder lake. An inclined shaft has been sunk to the 65-ft. level, where drifts and cross-cuts have been run, and a raise connected with the open pit. From the open pit level a vertical shaft or winze has been sunk to the 500-ft. level, stations having been put in at each 100-ft. depth. On the 500-ft. level about 150 feet of drifting and cross-cutting have been done. The openings are all in silicified dolomite with the exception of a narrow trap dike occurring in the inclined shaft or tramway to the mill. A 10-stamp mill was built in 1908 and a few trial runs made by the Harris-Maxwell and the Lucky Boy Mining Companies. The last mentioned had the property under option for two months in 1909. An additional 30-stamp mill was built in 1912, and completed early in 1913, under management of E. T. Brooks, and run by electricity supplied from the Raven Falls hydro-electric power plant, which was completed at about the same time. Desultory mining has been going on since operations began. In the early days, according to M. E. Wilson, "a shipment of 1,500 lbs. from an open cut was sent to the School of Mining, Kingston, and yielded $13.20 to the ton. However, a mill run of 230 tons from the same open cut made by the Lucky Boy Mining Co. in 1909 averaged only 45 cents to the ton. A mill run from another surface showing gave $2.20 per ton." In 1913 a production was reported to the Ontario Bureau of Mines from ore put through the mill from shaft sinking. To a depth of 440 feet the workings are largely in grey dolomite while below this the rock is rich in fuschite cut by quartz stringers and carrying much tourmaline and pyrite, the quartz at times being a foot or more in width. On the 500-ft. level a drive was run into 30 feet of this material containing visible gold, some of which is quite coarse. The size of this ore shoot has not been determined. The gold, some of which is quite pale in color, suggesting the presence of silver, is usually accompanied with much fine galena. The plant, which is equipped with various motors, consists of a 40-stamp mill with crushers, amalgamation plates, Wilfey tables, hoists, compressor saw mill, planing mill, and carpenter shop. The mill is not running at present. Forty men were employed on the property on October 1st. The company intends developing on a much larger scale in the near future.

Block "D" Associated Goldfields (Reddick).

The Dr. Reddick, the pioneer property in the area, consists of two claims, H. J. B. 29 and 30, on the northeast arm of Larder lake. The gold deposits are on the former claim and a 20-stamp mill, not in use, 1,000 feet distant near the lake shore on the latter claim. This is the property on which gold was first reported to have been found at Larder lake. The rocks consist of alternating bands of dolomite and green schists, probably all sediments, striking approximately east and west and dipping 70° to the north. The dolomite contains a network of quartz veins, some of which have coarse gold showings. Development work consists of a 90-ft. shaft with approximately 725 feet of lateral work on the 83-ft. level, and numerous open pits. The mining plant consists of a 20-stamp mill and a 225 H.P. motor which drives a compressor of 2000 cu. ft. capacity. A mill run of about 100 tons from an open pit was put through the mill in 1908 and a small production recorded. According to M. Ogilvy, then in charge, this ore ran $10 to $12 of gold to the ton. On further exploration by H. P. Depencier a drive 350 feet long at the 83-ft. level was made in under the large open-cut, all of which was in material carrying but little gold. In the summer of 1911 development work was renewed by cross-cutting at the 83-ft. level in the opposite direction in the hope of ascertaining the extent of a second surface gold showing. At a distance of 62 feet from the shaft an orebody was encountered which is 20 feet wide and said to run $10 per ton. A small stope was made and some ore milled between July and October, 1911. after which time the property remained closed until the Associated Goldfields bought it in August, 1917. Since then an electric transmission line has been extended to the property and the stope on the 83-ft. level has been extended until it is approximately 250 feet long, 20 feet wide in the centre and tapering at the end, and 25 feet high (Oct., 1918). At that time gold could be seen in different parts of the top of the stope. The gold usually occurs in a fine-flour state with iron pyrites, some copper pyrites and native copper along dark seams of chlorite, calcite, fuchsite and other minerals. There is no trouble in finding samples containing visible gold on many parts of the dump. More aggressive mining will be done on this property.

La Mine d'Or Huronia.

Gold was found in 1912 on claims L.2586 and L.2587, on the west shore of Beaverhouse lake, in Gauthier township. These claims were taken up by La Mine d'Or Huronia and have been worked intermittently ever since, except in 1915 when an extensive examination was made of the property by A. Pare for N. A. Timmins who had the property under option, but the option was not exercised. A. G. Burrows describes the quartz veins as being narrow, and striking northeast in a greenstone cut by quartz porphyry dikes.

Gold is visible, accompanied by iron pyrites, copper pyrites, magnetite and calcite. Gold also occurs in veinlets in the porphyry. Development work consists of numerous test pits, approximately 1000 ft. of underground work and considerable diamond drilling. The plant comprises a 15-stamp mill, a tube mill, Dorr classifier, 3 concentrating tables, 2 slime tables and a cone classifier. Power was supplied for a time by the company's hydro-electric plant on Victoria creek, ¾ of a mile distant, but owing to scarcity of water the plant could not be operated for long. By Dec. 10th, 1915, a transmission line was completed from the Associated Goldfields and ample power obtained. The mill ran part of 1916, but the property was closed on Dec. 2nd, 1916, the total gold production being approximately $9,165. Operations were again resumed at the end of 1918.

Other gold prospects upon which some work has been done and worthy of mention are the Gold King, Chesterville, Kerr-Addison and Larder lake Proprietary.

The tournaline at the Harris-Maxwell and the magnetite on La Mine d'Or Huronia suggest that the deposits were formed at a high temperature and pressure and at a great depth.

Iron Pyrites Prospect in Hearst Township.

A promising pyrite prospect occurs on claim H.S.904 or No. 2717 on Sharp Creek, one-half mile from the southwest bay of Larder Lake, in Hearst township. This is one patented claim of a group owned by the Combined Larder Mines, Ltd., in which James Hales, Barrister, Imperial Bank Building, Toronto, is interested. The claims were extensively prospected near the surface for gold several years ago, but apparently with little success. In October, 1918, the writer while examining some of the old workings noticed that a mineral dump on the above claim, H.S.904, consisted almost entirely of massive iron pyrites with some gossan. The shaft was full of water, but the owners reported the shaft to be 25 feet deep with a 25-ft. cross-cut at that depth, all of which were in pyrite. The dump consists mainly of fine-grained massive pyrite with occasional quartz and dolomite stringers carrying a little pyrrhotite and magnetite. An eight-pound sample which was fairly representative of the dump yielded on analysis 43.00 per cent of sulphur and 4 cents of gold to the ton. About 100 yards northwesterly from the dump with intervening drift-covered surface is a deposit of 'sugary' quartz and 100 yards farther along the same strike is a 30-ft. shaft in a banded formation of 'sugary' quartz with much pyrite and pyrrhotite. The rocks in the vicinity are predominantly green chlorite schists and pillow lavas. The deposit is apparently worthy of further development. It lies 12 miles distant from the T. & N. O. Ry., 1½ miles from the Associated Goldfields hydro-electric transmission line. Massive iron pyrite several feet wide was also seen at a 6-ft. pit on claim H.S.913 in the southeast part of Hearst township.

GREENLAND'S MINERAL RESOURCES.

Recently a report was published in the newspapers that Greenland might be offered to Canada by Denmark, if the Allies would agree to certain annexations to Denmark. In the Toronto "Globe" an editorial writer offered the opinion that ownership of Greenland was undesirable. Similar remarks were made in the United States years ago concerning the proposal to purchase Alaska. There is no evidence of wealth in Greenland comparable with that of Alaska; but the possibilities are worth looking into.

Replying to the Globe's editorial, Dr. W. G. Miller, Provincial Geologist of Ontario and Canada's representative on the Imperial Mineral Resources Bureau writes: "You say 'the exports include seal oil, and seal, fox and bear skins, fish products and eiderdown.' But you have not mentioned the most unique of the exports, viz., the mineral cryolite. Greenland is the only country in the world that produces or has produced this valuable mineral. Cryolite has been found in a couple of other countries, but not in economic quantities. The mineral is a fluoride of sodium and aluminum and is used for several purposes, notably in the manufacture of an opalescent glass, and of enamel for ironware; a large quantity has been employed in the production of aluminum. Associated with the cryolite are small quantities of the ores of zinc, lead and copper.

"The unique deposit was discovered at the end of the eighteenth century and mining began in 1854. It extends on the surface 600 by 200 feet. The depth to which mining has been carried is over 150 feet and the deposit shows no signs of giving out. Up to 1901 a total of over 307,700 tons had been mined. In recent years the production has been from 10,000 to 14,000 tons annually. About one-third of this is exported to the United States; approximately one-half of which is reshipped to Canada for use in the aluminum industry. Canadian imports from the United States in 1913 had a avlue of $50,905; in 1914 the value was $44,683, and in 1915 it was $72,024.

"Another unique mineral occurrence in Greenland is that of the native iron that occurs on Disco Island on the west coast. Large blocks of almost pure iron were found lying loose on the hillsides and were originally supposed to have a meteoric origin, but later the native metal was found in place in basaltic rocks.

"The largest known meteorite, called "Ahnighito" or "The Tent," was discovered in Greenland. It was brought from Cape York some years ago by Rear-Admiral Peary and is now in the American Museum of Natural History, New ork. It weighs 36½ tons.

"Let us get Greenland if we can and turn some of our well-trained prospectors loose there! They may find other mineral deposits, which will easily wipe out the yearly deficit you mention, that is only $30,000. The country as yet has had little encouragement, trade being a monopoly of the Danish Crown. The fisheries are also capable of much larger development."

The name of Mr. George Torrance Milne, His Majesty's Trade Commissioner-General in Canada and Newfoundland, is included in a recent list of Officers of the Order of the Empire (Civil Division) in recognition of services rendered during the war period. Previous to his recent appointment to Montreal, Mr. Milne was British Trade Commissioner in Australia for five years. He has also resided in various parts of South America. He is a Medallist of the Royal Society of Arts, London, and a Fellow of the Royal Geographical Society.

Pulverized Coal in Blast Furnaces

Use and Application of Pulverized Coal to Blast Furnaces as developed by Experimental Work at the International Nickel Company's Smelter at Copper Cliff, Ont.

By W. L. WOTHERSPOON.

I appreciate the interest readers of the Canadian Mining Journal will have on this subject as the influence on the economic aspects of smelting is far reaching. Our experimental work is not yet finished, and I am not prepared at this date to deal with the subject as I should desire. However, the following informaton may be of interest.

The use of pulverised coal in blast furnaces for the melting of metals, smelting of ores, etc., owes its conception to the ideas of Mr. U. A. Garred, and Mr. Thomas W. Cavers, the former an American Engineer, who was formerly Chief Engineer at Washoe Smelter of the Anaconda Copper Mining Company, and who later was engaged on important engineering work with the Mount Morgan Gold Mining Company, Mount Morgan, Queensland, Australia; and more recently at the copper refinery of the Nichols Copper Company, Laurel Hill, Long Island. Mr. Garred has been closely associated with the writer during the past two years, but it is only recently that it was possible to conduct experiments on a large scale at Copper Cliff, owing to the fact that the whole energies of the staff and employees of the International Nickel Company were needed for the nickel requirements of the Allied Governments, which included very heavy responsibilities, not only in operating for production, but in extensive construction work, included in which is the Port Colborne Refinery, constructed at an expenditure of over $5,000,000. However, a few months ago, Mr. Garred was able to take one of the standard blast furnaces, smelting 500 to 600 tons a day and, by making small modifications to it, proved by practical demonstration that a considerable portion of the coke could be replaced by powdered coal. Extended runs have taken place with normal percentages of coke—namely, 12 per cent reduced to about 6 per cent, with deficiency in fuel supplied in the form of powdered coal, thus showing, even under those conditions, very important economies. However, Mr. Garred feels that his experiments should be carried further, and that very soon he will be able to reduce the coke consumption still further ,if not replace it entirely.

While Mr. Garred was proceeding with his development work, Mr. Cavers, a Canadian, was engaged at the Tennessee Copepr Company, Copper Hill, Tenn., on work of a similar character. The results at Tennessee have been like those at Copper Cliff, very encouraging, as may be inferred from the following data. The work carried on by Mr. Cavers applied to standard blast furnaces with run of mine ore. Under normal conditions, consumption of coke with such ore amounted to 6 per cent. Several months ago two runs, one of twelve days, and another of fifteen days, were arranged, when the coke was replaced in its entirety by powdered coal, and the percentage of the latter used amounted to 3.8 per cent. This showed not only that an expensive fuel could be replaced by one of considerable less cost, but that there was a decreased tonnage of fuel required, amounting to approximately 30 per cent.

At Tennessee the manufacture of sulphuric acid from the blast furnace gases was of the greatest importance, and as a portion of that acid was used in connection with the manufacture of high explosives, it was decided by the management not to continue the use of powdered coal until the end of the war, owing to the anxiety of the inspector, who felt there was some chance of small quontities of unconsumed carbon causing discolorization of the acid. These special conditions are happily over, and the Tennessee Copper Company has now arranged to proceed actively with the use of powdered coal, and plans are in preparation for the utilization of the Garred-Cavers processes in three additional furnaces.

Patents have been granted to Messrs. Garred and Cavers in the United States, Canada, and many other countries, and other important patents are pending.

The processes are revolutinary, in that combustion of pulverized fuel takes place under pressure in the restricted spaces in the charge of the furnace. These spaces are the voids in the charge of ores, fluxes and by-products, and the channels in same that occur in the smelting zone. Under certain circumstances, for special cases, additional combustion space is provided by specially designed furnace jackets.

The pulverized fuel is prepared in the usual way and fed in predetermined quantities to the tuyeres of the furnace, where it meets the air blast supplied in the usual manner.

A company, known as the Garred-Cavers Corporation, has been organized, with offices at 43 Exchange Place, New York City, for the prupose of developing the work embodied in the Garred-Cavers patents, and there has already been shown great interest in the work done to date at Copper Cliff and Tennessee, which is particularly encouraging to those smelting companies whose operations are carried out in certain localities where the coke problem has been acute. For instance in Peru there are smelters and there are coal mines, but in the past it has been necessary to ship coke to the smelters from the United States. There are also smelters in Africa and the Belgium Congo, where coke was supplied from England.

The possible economies are far reaching. Under the auspices of the Garred-Cavers Corporation an aggressive policy in connection with the devlopment of the processes will be pursued.

Rocky Hard Coal Co.

The Rocky Hard Coal Company, which has large interests in what is known as the Alberta Coal Branch of the Grand Trunk Pacific, are actively operating on a large hill of coal which extends 60 feet above the level of the railway tracks, coal being taken from a facing of about 400 feet. The field is located near Coalspur station, 47 miles south of the town of Edson.

The coal is of good quality, and is being shipped as far East as Winnipeg. Its accessibility is indicated by the fact that steam shovels are being used in loading the coal directly from the coal beds into the cars.

Coal Production in Canada--Its National Significance

By F. W. GRAY.

The Federal Department of Mines announces that the production of 15,180,000 short tons of coal from Canadian collieries during 1918 is the largest annual production yet recorded for Canada. The significant figures are the reduction of 337,000 tons in Nova Scotia, and the increase of 1,263,000 tons in Alberta, when compared with 1917 tonnages. For the first time also the coal output of Nova Scotia takes second place among the Provinces and Alberta leads with a production approximately estimated at six million short tons.

The continued reduction in the coal production of Nova Scotia is a direct result of war conditions, chiefly associated with and arising out of heavy enlistments of skilled miners in 1915 and 1916.

The increase in Alberta's coal output is doubtless the result of the campaign carried on by the Fuel Controller early in the year 1918 to encourage the use of Albertan coal in substitution for anthracite imported from the United States, and possibly also some export of coal from Alberta to those districts of the United States lying directly to the south of the coal districts.

While, therefore, the outstripping of Nova Scotia by Alberta may at this time be regarded as a direct result of the war, and while it may be that during the next ten years we may see some attempt in Nova Scotia to regain the hitherto unchallenged position of that Province as the leading coal producer in Canada, yet the figures of 1918 have only anticipated an inevitable development of the future. As the population and industries of the Prairie Provinces increases, the relatively large coal resources of the West will become apparent, and Nova Scotia will do well if it holds the second place for any great number of years.

Great significance of the future of Canada, and great influence on the political orientations of the future, lie in these latest figures on coal production by provinces. The problem of the "manufacturing East" and the "agricultural West" that is so often dilated upon, and which has recently been emphasized by the belligerent, not to say selfish, platform adopted by the Western farmers, bids fair to assume a new aspect. Coal production always connotes industrial and manufacturing growth, and when the West commences to fulfill the destiny that is implicit in its combination of agricultural lands of vast extent, combined with mineral resources that far exceed those of the Maritime Provinces, the people who live "down East" will be compelled to hard thinking. Maritime union would seem to be a logical outgrowth from the changing relative conditions of the East and the West. There is a touch of the archaic in the retention by the three Maritime Provinces of New Brunswick, Nova Scotia and P. E. Island, of all the trappings and expenditures of three separate and distinct systems of parliamentary government, each with two legislative chambers, and this slightly archaic and decidedly expensive triplication of government extends into the administration of the natural resources of the mine, forest and sea.

Those who think of Canada as a nation, destined we trust to live in friendly independence alongside the United States, should not overlook the further significance of the coal production of the United States, which in 1918 reached the unprecedented and stupendous total of approaching seven hundred million tons of coal. In describing the coal output of the United States in these terms there is no desire to strain after superlatives. Coal production on this scale is in simple truth unprecedented in the world's history, and not only is it correct to describe it as stupendous, but one might go further and point out that it is a portent, a fact of to-day's history that should be digested and pondered over. The Canadian production of fifteen million tons, although it may constitute a record, is very small in comparison. National independence in this age of steam and electricity is well nigh impossible without the possession of coal.

There is a vague impression abroad that Canada's deposits of coal are vast and illimitable. This is not so. In consideration of its extent, its traditions of the past, and its hopes of the future, Canada is comparatively poorly supplied with coal deposits, particularly in the East. The coalfields of Nova Scotia represent but one per cent. of the coal resources of Canada, which is equivalent to stating that ninety-nine per cent. of the coal deposits of Canada are situated West of Winnipeg. A proper realization of the comparatively meagre coal resources of our country is a desirable thing to inculcate, because it will lead to a realignment of our ideas along many necessary avenues of thought, and it will emphasize the necessity for careful exploitation and conservation of Canada's coal wealth.

Among the British Dominions, Canada to-day ranks high as a producer of metals and minerals, but the extraction and purification of metals for commercial sale is in the first instance dependent on a supply of fuel. Wood fuel and water-powers have a certain limited application in this connection, but generally speaking, metal industries on a large scale are not possible in the absence of a plentiful supply of coal. In a country of vast distances, where transportation plays such an important part in our political development, and under somewhat rigorous climatic conditions, coal supply assumes an aspect of peculiar importance, an aspect that is not limited to provincial considerations, but is of national and federal importance.

We Should Have a Ministry of Mines.

It can hardly be contended that the coal industry of Canada, or any part of the mining industries of our country, are adequately represented by any ministerial department at Ottawa.

We need a Ministry of Mines, the creation of a portfolio in the Cabinet with real powers, assisted by ample funds, and employing under the leadership of a Minister of technical and financial ability, the specialists that are now scattered through a dozen unco-ordinated departments at Ottawa.

The Canadian Council of Agriculture which recently convened at Winnipeg, stated with becoming modesty that "Agriculture is the basic industry upon

which the success of all other industries depends." Well, maybe so, but will the agriculturists explain how modern agriculture could exist without coal and metals?

We will not say that mining men are modest, but it can be truthfully stated that the real importance of mining to Canada is but poorly appreciated by the country at large, and the basic nature of mining in Canada is overshadowed by the greater unity and possibly the greater vociferation of lesser breeds, who, if they are not already outside the law, are getting pretty close to being so, if the Winnipeg meeting of the farmers is indicative of the real feeling among these lords of the western lands.

A Ministry of Mines is being urged for Great Britain. A more far-reaching and pregnant proposal involves the co-ordination of the mining resources of the Empire, and their exploitation for the benefit of the associated nations thereof. Canada should not stay behind the procession. The mining industry should be represented in the Federal Parliament, and it should have a Minister of Mines to give it a voice and a policy.

BRITISH COLUMBIA'S COAL OUTPUT IN 1918.

With figures available which make possible an estimate of the coal output of British Columbia for the month of December it is found that the production of the Province for the year 1918 shows an increase over that of 1917 of approximately 174,096 tons. For the past year the total was 2,572,811 tons these figures, although based on reliable information, are as yet unofficial) as compared with 2,398,715 tons.

To those who have been closely following the past year's development in the coal fields of British Columbia this is a decided disappointment. At the end of the month of September it was thought that the end of the twelvemonth would find the production far in advance of that of 1917. Consequently the small margin indicated while not unwelcome, is not considered to be anything like as satisfactory as might have been confidently looked for if hard luck, in the form of the so-called Spanish influenza, had not intervened.

The influenza struck the coal mining camps with special violence. The effect of the epidemic was felt throughout the months of October and November in the output of the mines of Vancouver Island, as well as those of the mainland. But the result was particularly disastrous to the Island's showing, there being a slump which brought the aggregate of its collieries down to 29,139 tons below that of 1917; the total figures being: 1918, 1,666,582 tons; 1917, 1,695,721 tons. Increases, however, can be recorded in the Crow's Nest Pass and the Nicola-Princeton fields. In the former the output of 1918 is 179,200 tons ahead of that of the previous year and that in spite of the fact that for a time the influenza raged throughout that district. The explanation is to be found in the fact that in 1917 the output in the Crow's Nest Pass was seriously affected by the explosion of April of that year and the extended strike which followed. The Nicola-Princeton increase of 23,035 tons, the production of 1918 being 174,278 as compared to 151,243 in 1917, must be put down to development spurred on by the abnormal demand of recent months.

It is interesting and gratifying to be able to note that with the removal to an extent of the blighting influence of the plague among the miners in the month of December, the production immediately began to assume normal proportions. The result is that that month shows an increase of approximately 46,329 tons over the month of November.

Detailed statistics follow:

British Columbia coal production (approximate):

1918	2,572,811 tons
1917	2,398,715 "

British Columbia coal production by districts:

Vancouver Island—

1918	1,666,582 tons
1917	1,695,721 "

Nicola-Princeton:

1918	174,278 tons
1917	151,243 "

Crow's Nest Pass:

1918	731,951 tons
1917	551,751 "

Tonnages for the months of November and December:

	November. Tons.	December. Tons.
Crew's Nest Pass Colliery—		
Coal Creek	24,430	30,000
Michel	14,414	20,000
Corbin Colliery	7,847	8,500
Middlesboro Collieries	6,000	6,256
Fleming Coal Company	2,695	2,674
Coalmont Collieries	616	409
Princeton Collieries	2,263	1,500
Telkwa Collieries	178	150
Canadian Western Fuel Co.	49,121	59,946
Canadian Collieries (Comox)	27,065	44,171
(Extension)	12,807	16,261
(S. Wellington)	4,409	5,639
Pacific Coast Coal Mines	2,914	3,563
B.C. Coal Mines (Jingle Pot)	3,257	4,147
Nanoose Collieries, Ltd.	1,112	2,351
Granby Consolidated	2,010	2,500
Totals	161,138	207,467

NOVA SCOTIA STEEL AND COAL CO'S PROGRAM.

D. H. McDougall, president of Nova Scotia Steel and Coal Company, Limited, announces that the company will take advantage of the slack spell in steel production to overhaul the plant and make certain additions and changes with a view to securing greater efficiency. Chief among these latter will be the provision of new and thoroughly up-to-date by-product coking ovens. Further the Wabana mines will be developed so that the Scotia Company will produce iron ore far in excess of its former outputs and at materially reduced cost.

Hayden Stone and Company, who represent the large United States interests in the Nova Scotia Steel and Coal Company have aided in the developments of these plans which will require considerable time and capital. The position of the company is strong at the present time, having regard to the provision of an additional $5,000,000 of working capital due to the sale of that amount of stock in 1917 and also to the fact that the company is in a strong financial position with net current assets of $10,000,000.

Special Correspondence

NORTHERN ONTARIO.

Surveying Des Quinze Water Power.

Signs of activity are apparent in connection with the Great Des Quinze water power project, which is situated some 25 miles northwest from Cobalt. Although very few details are available, it is understood a staff of surveyors were engaged last month by M. J. O'Brien, Limited, a twenty million dollar corporation of Montreal, headed by M. J. O'Brien, of Renfrew. This corporation was formed some time ago for the taking over of the extensive interests previously held by Senator M. J. O'Brien, among which is a part of the great water power of Des Quinze. This is perhaps the greatest undeveloped water power in the Province of Quebec. Various estimates place the power of this wonderful volume of water all the way from 150,000 to 250,000 horse power. Situated as it is, in the central part of the great mineralized area of Northern Ontario, as well as close to the great pulpwood resources of the district, it is considered highly probable a development of great magnitude is under contemplation. Up until the present time no official advice has been given out regarding the intentions of the big corporation. Although the ending of the war was expected to be the signal for extensive developments in the pulp and paper industry of the North, the actual commencement of work on this great power scheme would come as a considerable surprise to the inhabitants. Whether the present survey is for immediate use or for a more distant date is a matter of much speculation. As is well known, M. J. O'Brien acquired the nucleus of his large fortune in the development of the natural resources of the North Country, among which operations the most noteworthy are the O'Brien Mine of Cobalt and the Miller Lake-O'Brien mine of the Gowganda camp. Each of these mines are producing upwards of a million dollars' worth of silver per annum, and have extensive ore deposits in reserve. Therefore, when these extremely important facts are taken into consideration, there appears ample reason to believe the not distant future development of the great Des Quinze power is actually being considered. The development of this power is a matter of great interest to the district in general, providing, as it undoubtedly would, ample energy for the many new industries which no doubt will eventually be developed in the mining, pulpwood and lumbering sections of the North Country, where abundance of raw material awaits but the necessary power and supply of labor to turn it into marketable products.

One Company Asked for 1,000 Men.

One of the Porcupine mining companies recently asked the Organization of Resources Committee, Toronto, to supply them with one thousand men. This mine is presumably the Hollinger Consolidated, where, it is understood, about 2,500 men are required to work the mining and milling plant at capacity. The request was made that the men be supplied, four hundred in the first group and forty per week thereafter until the desired number was attained. During the past couple of years about twelve hundred men have found daily employment at the Hollinger-Consolidated, and a one thousand ton daily capacity addition put on the mill has so far not been utilized, except for but a short time. The employment of a working force sufficiently large to permit of operation at capacity, will be followed by a big increase in ore treated and gold production. During the year just past the Hollinger-Consolidated paid 5 per cent. in dividends, which amounted to $1,230,000. A plan for the erection of a large number of houses to meet the needs of the increased staff of workmen at the property is understood to be under consideration. The Hollinger-Consolidated mine is the nucleus of the town of Timmins, and housing accommodation in this thriving gold mining town at the present time is said to be inadequate.

Kirkland Lake Mines Forging Ahead.

The prevailing epidemic of Spanish Influenza was a retarding factor in the developments at several of the Kirkland Lake gold mines during the past month. The epidemic now appears to have run its course, making it possible to carry on normal work and the usual production is anticipated for the current month. Taking into consideration the position of the operating mines, together with the various new developments under contemplation on a number of the leading and well-situated prospective properties, it is evident the Kirkland Lake district is entering upon the most active period in its history. With the Kirkland Lake Gold mines almost ready to begin production in a big way, thus joining the Lake Shore and the Teck-Hughes in the producing list, and with the probability of the Tough-Oakes being among the producers within a few months, the Wright-Hargreaves proceeding with the installation of one of the largest mills in the camp, the Burnside having this month about completed the installation of a 30-ton mill, the probabilities are that six mines will be producing gold in the Kirkland Lake district before the end of 1919. The increase in the number of non-producing, but promising properties that will be operated in an aggressive manner during the year may reasonably be counted upon to at least keep pace with the number of producers. The opening month of the year 1919 finds the camp in the best proven as well as prospective position in its history. The developments of the six aforementioned mines have proven the stability of the camp, while the extent of the promising properties on which extensive development work is planned, gives good reason to believe that the producing area of the Kirkland Lake camp will be greatly enlarged.

Potter and Stevenson Properties.

Early developments of an interesting nature are shortly to be expected in connection with a consolidation of the Potter and Stevenson properties in the Kirkland Lake camp. These properties are centrally located, being situated on the south side of the Lake Shore Mines. American capitalists are understood to be concerned in the early development of the properties, which it is expected will soon be in operation.

Will Begin Work at Hunton-Kirkland Soon.

Plans are now under way aiming at the actual commencement of development and exploration on the Hunton-Kirkland property some time in February. A deal was recently closed for the purchase of the property, the first cash payment having been made. The ultimate purchase price is said to be well up in six figures. Some of the richest samples of gold ore ever found in the Kirkland Lake district came from the surface of the Hunton. At the outbreak of the European war, English interests were negotiating for

the purchase of the property, but nothing of a concrete nature transpired. With the ending of the war it was not surprising that these promising claims should attract attention, and the announcement that Toronto and American capitalists will develop the property gives general satisfaction.

Kirkland Townsite.

English interests are understood to be involved in a deal for the Kirkland Townsite property, and while the engineers of the company look upon the proposition favorably, the final ratification remains in the hands of interests in England. In well-informed circles, however, it is believed nothing of an adverse nature will develop, and the final sanction of the terms of purchase will be transacted in a short time.

Tough-Oakes.

It is now considered only a matter of a short time until some definite plan will be decided upon for a resumption of operations at the Tough-Oakes Gold Mines of Kirkland Lake. A general meeting is to be held at which a new directorate will be placed in charge. It is considered probable that at least a portion of the present directorate will remain on the board. According to semi-official advice, Commander Burnie, of London, Eng., is now in control of the company, and from the same source it is also learned that Mr. Kilpatrick, also of England, and who is associated with Mr. Burnie, is soon to arrive in Canada for the purpose of arranging the future policy of the company, on behalf of his principal. In the meantime the mine workings are being kept pumped out, and the large, efficient mill is being kept in a good state of repair. The course to be taken on resumption of operations will probably be an aggressive underground development program for a few months, followed by the re-opening of the mill. Sufficient money to carry out such a policy is said to be now on deposit for the company in Canadian banks. Before becoming involved in its costly and serious litigation the Tough-Oakes was the leading producing mine of the Kirkland Lake camp. For a time a production of approximately $60,000 monthly was maintained. By those in a position to intelligently judge of the merits of the property it is considered possible that this record will be exceeded, providing the mine is given a fair opportunity. The news of a settlement of the differences of the company's interests is of vital importance to the future of the company, and has been the cause of rejoicing by shareholders in the district.

Boston Creek Merger.

Well-founded reports are current of the merger of the R. A. P. Syndicate property and the Boston Creek mines, of Boston Creek. A merger such as reported to be probable should work out to the mutual benefit of the two companies. On one of the properties is a good mining plant sufficiently large to develop both companies' holdings to a large extent, while on the other camp buildings adequate for the accommodation of a large working force have been erected. On both of the properties considerable underground work has been done, and a good deal of gold ore has been blocked out.

Electric power is available in the Boston Creek field, obtainable from the Northern Ontario Light and Power Company, whose transmission line passes through the camp. The next few months are expected to be important ones in the history of the development of the Boston Creek field.

Burnside Mill Nearly Ready.

The new mill at the Burnside property at Kirkland Lake is receiving the finishing touches and will soon be ready for operation. It is probable the mill would have been ready for operation earlier, had it not been for the fact that a number of wrong parts of equipment were shipped by the manufacturers. However, all should be in readiness for a trial run by the end of the current month. The new mill has been designed with a capacity of thirty tons per day. Provision has been made for increasing the capacity of the plant according to the requirements of the mine development. The Burnside adjoins the Tough-Oakes.

Machinery Arriving for Indian Peninsula Mill.

The first car-load of machinery for the new 100-ton mill for the Indian Peninsula Mining Company has been shipped to the property. A first-class road has been cut from the town of Amos on the Transcontinental Railway to the mine. The property is located about twenty-one miles south from the railway and the Quebec Government built fourteen miles of the new roadway to the property, while the company completed the remaining seven miles, making available a good winter road over which the machinery and other equipment for a flotation mill of 100-tons daily capacity will be taken in. The company expects to have the plant treating this amount of molybdenum ore early in the spring. The ore will pass through a 13 x 4 crusher, and be elevated to a bin from where it will be fed by belt feed to a 5 x 5 ball mill in close circuit with a Duplex Dorr classifier, the water being controlled in the ball mill to the desired moisture. A 100-ton Groch Centrifugal duplex unit will be used to float the molybdenite. The plant will be steam driven. The company has cut nearly all the timber for the construction of the mill with its own saw mill plant. The control of the stock of the Indian Peninsula is under option to the Penn-Canadian Mines interests, which assures efficient and energetic development of the property.

Ontario-Kirkland New Plant Ready.

The Ontario-Kirkland property, formerly the Hud claims, is ready to operate its new electrically operated plant, and is fully equipped with the requisite machinery to carry out the proposed program of more than 1,500 feet of underground work. Some considerable delay in receiving the supply of electric energy took place, or the plant would have been in operation before Christmas. Sufficient capital has been made available for the development program, which includes continuing the 100-ft. shaft to the 300-ft. level and the driving of about 1,500-ft. of drifts and cross-cuts. Several well-mineralized veins in which gold occurs are in evidence on the property.

Miller-Independence.

Mr. W. E. Simpson, who, together with Mr. Fr[illegible] Groch, of Cobalt, is consulting engineer for the Miller-Independence Mines at Boston Creek, left the first week in the new year for the mine, for the purpose of thoroughly sampling and surveying the property. The entire surface and underground workings are to be surveyed and sampled. This work is preliminary to the beginning of the big development program now proposed, and for the carrying out of which the capitalization of the company was raised from 500,000 to 700,000 shares. The new issue of the stock, which consisted of 200,000 shares, is understood to have been subscribed for at $4 per share, thus proving ample capital for extensive operations.

1,950,000 Tons Proven Ore at the Dome Mine.

According to official advice concerning the affairs of the Dome Mines, the outlook for the company is bright. In many ways the policy adopted during 1917 has been justified. In the light of events which followed the actual curtailment of work, with the exception of a comparatively small force engaged on development and underground exploration work, there was no alternative but to have adopted such a policy. Already costs of conducting mining operations are receding, labor is becoming more plentiful, with a decided improvement in efficiency, and in various ways conditions are adjusting themselves.

Official figures show 1,950,000 tons of proven ore. The average gold content is $5.10 per ton. The total value is $9,945,000. Prior to the economic strain caused by the war the Dome reduced its ore at a cost ranging only slightly over $2.50 per ton. To equal such a record seems the probable thing to expect during future operations. It may be, however, that as mining is carried to deeper levels, the cost of producing may record some increase. It should perhaps be pointed out that the above figures of ore reserves occur in ground between the surface and the 700-foot level. Not one pound of ore below that depth is included in the estimates of close to ten million dollars. Therefore, even though work has been carried to a depth of 1,245 feet, and a considerable lateral work done between the 700-foot level and that depth, and a number of orebodies are being cut, yet its enormous value is not sufficiently proven to be definitely included in the proven ore reserves. This section of the mine, perhaps of greater value than the upper workings, remains as yet a great potential asset, the amount of which will be estimated following the requisite amount of development work. The ore in the lower levels, as so far indicated, is of a higher grade than that occurring in the upper workings. Therefore, any slight increase in the cost of reducing the ore will be compensated for in the higher average gold content. Conservative mining interests estimate the probable profit from every ton of ore treated for the next several years at the Dome, at $2.50 per ton after paying all costs.

The surplus as of October 31st last, is expected to be sufficient to cover requirements pending the return to a producing basis.

The capacity of the Dome mill and the mining facilities for providing the full tonnage to keep the mill at full capacity is approximately 40,000 tons per month. In computing these figures, all the added energy necessary to hoist ore from great depth is taken into full consideration.

Therefore, treating 40,000 tons monthly, recovering over $5 per ton or upwards of $200,000, it follows that with a net profit of $2.50 per ton the total net profits would approximate $100,000 monthly. Total output is thus expected to exceed $2,500,000 annually with net profits of $1,200,000.

The company is capitalized at $5,000,000, divided into 500,000 shares, with a par value of $10 per share. Just 400,000 shares are issued, the balance remaining in the treasury. Therefore, the company is obliged to pay dividends on only the $4,000,000 issued capital. It will at once be seen that a net profit of $100,000 would be equal to 2½ per cent. monthly, or 30 per cent. annually.

Mining at the above rate, the present proven ore reserves of the Dome are four years ahead of mill requirements. Of this upwards of 320,000 tons, or eight month's requirements, is already broken and lying in the stopes, the cost of mining having already been paid for. Also in the extensive workings from the 700-foot level down to nearly one-quarter of a mile the tonnage of ore added to reserves annually from this date forward may reasonaly be expected to exceed the tonnage taken out—this to continue for a good many years. In the past the company easily paid dividends at the rate of 20 per cent. annually. With the present improved facilities making possible a maximum profit of 30 per cent. annually, the contention of conservative mining men in declaring dividend disbursements at the old rate will follow close upon the heels of a resumption of production seems quite reasonable—even after making all due allowance for unforseen contingencies.

Will Develop Fidelity Property.

Fairly extensive plans for the development of the Fidelity property in Teck township adjoining the Kirkland Lake LaBelle Mine have been decided upon. Already a portion of the machinery for the plant has arrived at Swastika, and is being taken to the property. The new plant will be steam driven.

New Development Work in Whitney Township.

Preparations are under way for the starting of mining operations on the two claims north of the Bellinger Mining Company in the northwest of Whitney township at an early date. The claims lie three miles north of South Porcupine, and have been acquired by Toronto interests. There is a 200-foot shaft on the property with 20-feet of lateral work at the 100-ft. level, and 50-ft. of crosscutting at the 200-foot level. A vein of ankerite and quartz stringers running parallel and 35 feet in width has been uncovered. A number of stringers in the main vein carry gold values. Mr. T. J. Wright is in charge of the work of fixing up the road and taking in machinery for the operation of the property.

Steam Plant for Canadian-Kirkland.

Arrangements are being made for the installation of a steam driven mining plant on the Canadian-Kirkland property in the Kirkland Lake camp. The Canadian-Kirkland property was recently taken over by Geo. E. Drummond, of Montreal, and D. H. Angus, of the Right of Way Mines, Cobalt. Providing development work with the steam plant proves satisfactory, later on it is the intention of the new control to install electrically driven machinery.

Alexo Nickel Mine.

During the month of December the Alexo Mine at Porquois Junction shipped 1,015,000 pounds of nickel ore, which is well up to the general average of the mine. The property is located about twenty-five miles east from Porcupine. A large body of peridotite is in contact with the pillow lava on its northern flank. The ore body has been opened up for upwards of 700-feet in length, and has a width of from three to forty feet, and a dip of from 65 to 80 degrees to the north-west.

Power Plant for Gowganda.

Reports are current of the likelihood of the South Bay Power Company proceeding with the construction of its power plant in the Gowganda district with the arrival of spring.

Casey-Cobalt.

During the third week in January the Casey-Cobalt Mine, situated in the township of Casey, about nine miles north-east of the town of New Liskeard, shipped two carloads of silver ore. One carload was consigned to Cobalt, while the other went to Denver, Colo., for treatment. The Casey-Cobalt is the only operation in its immediate vicinity, and is a regular producer of silver ore.

Drilling Cotter Property.

Results of the diamond drilling operations on the Cotter property at Boston Creek have been so favorable that the company operating these claims have decided upon the preparation of plans for extensive mining operations, which will be carried out as soon as possible.

Boston Creek.

The importance of the Boston Creek camp is being more clearly brought to mind every day, with the sensational deposits of gold ore on the Miller-Independence, the Hollinger interests developing the Mondeau, and the Mining Corporation of Canada seeking property in the camp, together with recent developments on the Cotter and Cullen-Renaud properties, it appears certain much substantial development will be accomplished in the district during the current year.

BRITISH COLUMBIA.

Mr. George Fraser has resigned the position of Superintendent of the coal mining operations at Cassidy's, Vancouver Island, of the Granby Consolidated Mining & Smelting Company. Mr. George Hargreaves also has resigned the position of mine manager. The duties of both the foregoing offices have been assumed by Mr. R. R. Wilson, formerly General Superintendent of the Crow's Nest Pass Coal Company, Mr. Wilson is a son of Mr. W. R. Wilson, General Manager of the Crow's Nest Pass Coal Company.

Lack of Interior Lubrication Cause of Hoisting Accident .

A verdict has been given by the Coroner's Jury before which an inquest was held into the cause of the death of sixteen coal miners at Nanaimo, B.C., on September 10th last. It reads as follows:

"We, your Coroner's jury, empannelled to inquire into the death of Robert Kelly and fifteen others in Protection Shaft, of the Canadian Western Fuel Company, September 10th, 1918, find that the said men came to their death by descending on a defective cable, which broke owing entirely to the oxidizing of the wires, chiefly caused by apparent absolute lack of any internal lubrication, leaving the wires thus exposed to the action of a more than normally corrosive water and a humid atmosphere. In view of the evident general unreliability of exterior lubrication measures, which from the evidence adduced failed to preserve to any very appreciable extent the life of said cable or preclude against deterioration, we suggest that the Department of Mines recommend the appointment of an expert inspector of hoisting ropes, cages, safety catches and all appurtenances generally, and that legislation be enacted whereby under such abnormal conditions as obtain in said shaft no new hoisting cable be retained in service longer than some reasonable time to be determined by the Department of Mines as otherwise there would appear to be no practicable process which can be adopted and absolutely relied upon looking to the absolute dependability of such hoisting cables against defect or breakage under all present governing conditions."

Nanaimo Coal.

Criticism of the quality of coal being turned out i Nanaimo, B.C., by a writer of Vancouver, B.C., i much resented in the former town. One of the paper of Nanaimo observes: "In this connection it must b remembered that the local mines have been workin under the same war conditions which have hampere every other industry as well as that of coal mining Since conscription came into force work has been ne cessarily cut down to meet the new conditions unt lately practically one shift only each day has been th rule. At the same time, with the supply of efficien labor thus reduced, the demand for coal increase from every quarter. In order to meet the enormou demand at least half way it has been found necessar to send out Nanaimo coal without having been, as fo merly, washed and screened. At the same time co of somewhat inferior quality from the Harewoo Mine, has been mixed with the coal of the best loc quality in order to keep up with the demands fro day to day." The writer explains that the publi have had to stand for "War Coal" as they stood fo "War Bread," and with reference to the quality Vancouver Island coal quotes Professor E. T. Hodg who said that of Canada's coal reserves British Co umbia has the best as well as the most of it.

The strictures to which objection is taken read i part as follows:

"Take, for instance, the price of coal in this Cit (Vancouver). We are forty miles from the p mouth by water. Coal is transported on scows towe by tugs, the very cheapest form of coal transport tion. Yet run of mine coal, composed of a large pr portion of worthless slack and other rubbish, costs much per ton in Vancouver as the finest Pennsylvani anthracite coal, washed and screened, costs in Toro to after being transported by rail several hundre miles from the mines. I should judge a ton of th kind of coal supplied in Toronto will generate fift per cent more heat than the stuff which clogs ou pipes with soot and our grates with clinkers. If ther was an honest intention in right quarters, Vancouver coal bills would be reduced by at least 25 per cen pronto. Apparently there is no intention, honest o otherwise, of anyone in authority making an inquir into the oppressive coal prices of this city. We Vancouver inflicted with an Ontario climate our co situation would be little short of desperate, as indee it has been at times, and that with millions of tons coal within forty miles of the city."

Copper Smelting.

The Vancouver Chamber of Mines announces that it winter series of lectures on mining has been inaugura ed, the first having taken place on the 7th of January when Prof. Turnbull, of the University of British C lumbia, delivered a lecture on "Copper Smelting."

PLATINUM AT FRANKLIN CAMP, B.C.

The establishment recently of the fact that there is platinum bearing mineral in the Franklin Camp, near Grand Forks, B.C., has caused a flutter of interest in British Columbia mining circles. Mr. William Thomlinson, ore sampler for the Canadian Munition Resources Commission, spent some time in that district late last summer and his report, which has just been published, is accepted by some as indicating that prospectors are close on the trail of the source of the platinum which has been found in the placer ground of the Tulameen River.

Mr. Thomlinson states that he is authorised to make public the following information regarding the tests for platinum made on the material taken by himself, during the month of September last, from mineral claims situated on the so-called "black lead" in Franklin Camp, Grand Forks Mining Division. He proceeds:

"Early in the month of August I visited Franklin Camp and took samples from the various workings on the "Maple Leaf" mineral claim, and sent the samples to the Dominion Assay Office at Vancouver to be assayed for platinum. Two of the samples from the "Maple Leaf" claim taken from an open cut from which two cars of copper ore had been shipped were found to contain, respectively, 0.15 oz. and 0.17 oz. of platinum per ton, and the results appears to me to indicate that the platinum content of the ore was roughly proportionate to the amount of the primary copper minerals, especially chalcopyrite, showing in the ore.

"Later Mr. J. J. O'Neil, of the Dominion Geological Survey, visited the "Maple Leaf" Claim with me, and being interested in the mode of occurrence of the platinum took a sample of almost pure chalcopyrite, occurring as a small lense in the pyroxenite, and has the sample assayed for platinum at the Dominion Assay Office at Vancouver. This sample showed a content of 0.38 oz. platinum a ton.

"The mineral bearings gangue on the "Maple Leaf" claim is mainly pyroxenite, with some tongues or inclusions of augite-syenite on the hanging wall side of the lode, and the copper minerals, principally chalcopyrite, occur in bunches and veinlets and as disseminated specks, throughout the pyroxenite and the syenite.

"Owing to good results from the Maple Leaf samples and noting that the pyroxenite zone or so-called "Black Lead" extends almost entirely across Franklin Camp, I visited and sampled all the principal properties situate on the pyroxenite-syenite contact zone. On most of the claims so situated the lode material appeared to be barren of economic minerals; but on several of the claims there could be seen at or near contacts a tendency for the copper or iron sulphides to form mineralized belts or masses. Most of my samples were taken from places where such segregations of copper and iron sulphides occurred and especially from where the copper-bearing minerals were in evidence; although the oxides and sulphides of iron were also included in the samples.

"Although most of the samples taken, on being assayed, showed appreciable amounts of platinum, it cannot yet be stated with certainty that more than very small portions of the "Black Lead" or pyroxenite belt can be mined on a commercial basis.

"In the samples assayed there appeared to be certain proportions between the copper-bearing minerals present and the platinum and the platinum contents; but at the "Mountain Lion" claim the platinum appears to be entirely associated with sulphides and oxides of iron.

"Whether the platinum occurs as native platinum or as sperrylite, the arsenide of platinum, has not yet been determined; but, I presume, it may be in the latter form, and associated with the sulphides and oxides of copper and iron where they are found segregated in the pyroxenite zone.

"On several properties, such as the "Gloucester" M.C., situate near to and on the dip of the pyroxenite ozne, platinum may also be found to be associated with the sulphide ores; and, perhaps, it may be advisable to have all the ores of the entire camp tested for the metals of the platinum group.

"There is, however, much yet to be learned regarding the mode of occurrence of the platinum, and as to the average values of the material forming the so-called "Black Lead."

"It is probable that only certain portions of the pyroxenite zone contains platinum, copper or other metals in economic amounts; therefore much further investigation may be required, but I certainly consider the matter worthy of detailed research on the part of the Government or of the large mining corporations.

"Samples of the undernamed properties contained platinum as follows:

"Maple Leaf," 3 samples, 0.15, 0.17, and 0.38 ozs.
"Iucky Jack," 3 samples, 0.04, 0.06, and 0.08 ozs.
"Mountain Lion," 2 samples, 0.09 and 0.09 ozs.
"Golden Age," 1 sample, 0.06 ozs.
"Averill Gp," 2 samples, 0.09 and 0.09 ozs.
"Buffalo," 2 samples, 0.08 and 0.19 ozs.
"Ottawa," 1 sample, 0.06 oz.
"Columbia," 1 sample, 0.04 oz."

Metal Output Order, $1,000,000 a Month at Trail.

During the calendar year of 1918, according to a statement given out by local officials, the value of the metals smelted or refined by the Consolidated Mining and Smelting Company, Ltd., at Trail, B.C., was approximately $12,676,247 (the figures for the month of December being estimated) or over $1,000,000 a month. Lead was the leader with a value of $3,500,000; spelter next being valued at $3,023,290; and the others followed. Some 75 tons of lead piping were made valued at $15,000.

Appended are the detailed figures:

Lead	(Lbs.)	40,662,704	$3,537,655
Spelter	(Lbs.)	25,453,797	3,023,290
Copper	(Lbs.)	9,951,781	2,557,000
Gold	(Ozs.)	72,205	1,444,000
Silver	(Ozs.)	2,088,331	2,000,476
Sulphuric acid	(Tons)	3,926	98,150
Bluestone	(Lbs.)	174,178	15,676
			$12,676,247

Many Arrays for Platinum Made.

A comparative statement of the gold bullion deposited at the Dominion of Canada Assay Office, Vancouver, B.C., shows that the year 1918 established a new record for that centre. The value of the gold bullion deposited was $4,080,184. In 1917 it was $3,257,220, and in 1916 $2,828,239. The increase in 1918 over 1917 was $822,964, and the increase in 1918 over 1916 was $1,251,945. During the latter part of the season 189 assays of platinum-bearing ores and sands were made and 77 deposits of platinum metals received. The purchase of platinum metals has been discontinued, but assays of platinum-bearing ores and sands will be continued to be made.

Accommodation is being made for the accommodation of about 150 men at Copper Mountain by the Consolidated Mining & Smelting Company. This work is

understood to be preliminary to the commencement of extensive development of the property known as Voight's Claims, which have been taken over by the Consolidated Company. This property adjoins that of the the Canada Copper Corporation, near Princeton, B.C., on which extensive work has been under way for several years, and which soon will be in shape for operation on a large scale.

Mining in Northern Manitoba.

The northwestern district of the Province of Manitoba is attracting some attention as a copper producer. The Mandy Company, which is a Canadian organization of a Tonapah, Nevada, firm, has had an output during the past year of about 9,000 tons of high grade copper ore. The property now is in shape, it is stated, to produce 20,000 tons in 1919, but whether this will be done in view of the present uncertain prospect in regard to the market is a question. In the same region, according to reliable report, diamond drill has been under way on low grade copper deposits with the result that some 2,000,000 tons have been blocked out. Transportation has been and still is somewhat of a problem. The ore which thus far has been shipped has gone to the Trail (B.C.) smelter. Realizing that the industry cannot stand so long a haul the company is planning to instal a smelter and build a railway giving connection with one of the main line Canadian railways.

Increased production of gold from Ontario Mines—

This week comes the important announcement that the directors of the Porcupine Crown Mine have decided to re-open the mine. This is one of the most hopeful signs for the gold district. From this date forward the idle mines may reasonably be expected to begin operations, and that within the next few months every gold mine of importance in the country will be operating at full blast. The next three former producing mines in line for resumption of production before very long are the Schumacher, the Dome and the Porcupine V. N. T. In the Kirkland Lake and Boston Creek districts activity is also increasing. During the month of December the Lake Shore Mine produced a greater quantity of gold than in any previous month in its history. In the Boston Creek districts, the Miller Independence has definitely arranged for deep mining, and is assuming ever larger proportions.

Will Examine Resources of Greenwood District.

Citizens of Greenwood, B.C., are doing everything within their power to keep the smelter of the Canada Copper Corporation, which was closed down recently, in that district and to make such arrangements as will result in its operation. They have faith in the mineral resources of that part of British Columbia; they believe that the mineral necessary to keep the smelter active exists in that vicinity and that it can be found; and they are not going to allow the smelter either to stand idle or be removed if anything within their power can prevent it. Hon. Wm. Sloan, Minister of Mines, has agreed after listening to their representations, that two of the Government Mining Engineers shall make an investigation of the conditions as to the ore resources of the Greenwood District, and submit reports at the earliest possible moment. The Citizens' Committee hope that these reports will justify their confidence and that it will be found practicable, in a commercial sense, to continue the smelter, which, of course, is the heart and the mainstay of the community of Greenwood.

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:-: EDITORIAL :-:

AMENDMENTS TO MINES ACT OF ONTARIO.

Questions of importance to prospectors as well as mining men in general, are being discussed. It is learned on good authority that a number of amendments to the Mining Act of Ontario are under contemplation. Any action taken, will have the double object in view of being beneficial to prospectors, as well as to the best interests of the mining industry. Among the questions being discussed is the advisability of inducing prospectors to have their claims surveyed soon after staking takes place, thus eliminating the danger of friction or dispute over uncertain and irregular boundaries. Toward this end, it would appear likely that the Department will allow the cost of survey for each claim to apply as the equivalent of about twenty-five days' work. This would be beneficial in two ways. First, many claims would probably be surveyed shortly after being staked, the cost of surveying to apply against the first instalment of work, and with these regularly established lines as guides, much of the inaccuracy of blue-prints gotten out on the strength of carelessly run claim lines, would not occur. Second, the burdens of the prospector would be made lighter to the exact extent of the cost of survey, which, under the present Act the prospector is now obliged to pay in addition to assessment work and patent fee.

Another matter that is receiving consideration is the advisability of placing a tin tag on all four corners of mining claims, instead of only on the No. 1 or north-east corner as at present. This, it is obvious, would cause the boundaries to be less liable to become confused in case of fire destroying one of the corner posts, on which might chance to be the one tin tag as at present specified.

Incidentally, in pointing out the two foregoing amendments, which are now understood, among other things, to be the subject of consideration, it might be well to also point out the necessity for amendments that would serve to protect co-holders in mining claims, where one or more of the co-holders have duly performed and recorded their assessment work, but where one or another of the co-holders has failed to do so, thus causing the entire mining claim to become automatically forfeited and imposing upon those whose work has been performed, the only alternative of applying for relief from forfeiture, involving a good deal of expense and uncertainty, as well as the usual legal proceeding before the Mining Commissioner. To overcome the possibility of such occurrences it would be necessary to add a "provisional" sixty-day period to the time when each or any instalment of work is required to be performed. Thus, in the event of one co-holder failing to record his work in the proscribed time, the remaining co-holders would have ample time in which to perform the delinquent's work, and thus protect their own interests, but the protection of such "provisional" extra period not to apply to the delinquent or delinquents themselves. Those performing the necessary work to protect the claim, should automatically become entitled to divide the entire forfeited interest of their co-holder among themselves equally or in proportion to the share of expense borne by each, or otherwise, as they should agree between themselves.

Another matter of deep concern, not only to prospectors, but to mining men in all parts of the province, is the retarding effect on the mining industry of the granting of mineral rights to settlers. It is pointed out that settlers take up land either for its cultivation or for "skinnin" the timber, and not for mining purposes. Invariably they fail to do any mining work. In various mining districts throughout the north, large sections have been held idle, due to the fact that settlers have paid some $20 or so to the Government for the right to settle on a piece of land. Undoubtedly this is a big contributing factor toward retarding development of the mineralized areas, and constitutes an evil that could be eliminated without retarding the settlement of the country. This would not rob the settler of the right to mineral occurring on his farm, provided he follow the regular proceedure of a prospector, and in addition to holding the farming rights, stake out claims and perform the required assessment duties devolving upon such a course. In the event of others staking the mineral rights of his farm, he would always be entitled to the payment for any damage to his land or buildings.

Greater inducement is being offered to those who are seeking out the hidden riches of the province of Ontario. Prospectors are being given every reasonable consideration within the power of the Department of Mines. Hon. G. Howard Ferguson, Minister of Mines, through Mining Commissioner T. E. Godson, K.C., is keeping an ever watchful eye on the mining situation in all parts of the province. Commissioner Godson is perhaps in touch with a greater variety of prospectors than is any other man in the Dominion. Disputes involving the good and bad points within the Mines Act are constantly before his attention. The opinion of gentlemen of the legal profession as expressed in each and every dispute is carefully weighed by the Commissioner, with the result that perhaps the most satisfactory mining law ever compiled, governs the mining industry of this province. Not only does this satisfactory state of affairs exist, but each year amendments are made which still further improve the Act.

It seems reasonable, therefore, to look forward to a number of the questions now under debate, as above outlined, figuring in the probable amendments for the year 1919.

Coal Dust Firing of Blast Furnaces

By T. W. CAVERS.

The increase in the price of coke in the last few years, and the ever-pressing demand for lower smelting costs, have led the metallurgist to try pulverized coal in the blast furnace. The experiments have been so successful that there is every reason to believe that the blast furnace will regain its former place in the smelting industry and again prove a serious rival to the reverberatory.

When coke is introduced into the blast furnace with the ore and flux, it is partially consumed by the surplus oxygen of the blast before it reaches the point where it is most needed. Even in rare instances, when the oxygen delivered at the tuyeres is practically all combined with the sulphur, iron and carbon in the lower part of the furnace, the hot, ascending sulphur dioxide gases, coming in contact with hot coke above, are decomposed and the coke consumed.

The logical place, therefore, for the introduction of fuel is at the bottom of the charge, a little above the level of the molten slag in the crucible. This condition is secured in coal dust firing.

By the introduction of coal with the blast, the abundance of oxygen in intimate contact with the finely divided coal, ensures its complete combustion at a point a little above the level of the tuyeres, and, consequently the utilization of all the heat generated. It has been found in practice that the coal necessary to keep the furnace in good running condition is only 55 per cent. of the coke used on the same charge. The furnace runs more smoothly and gives less trouble with crusts when using the coal. No coke whatever is used except for "blowing-in."

In the blast furnace, the fuel maintains the temperature at which the various reactions take place, and supplies the reducing agent in roasted ore smelting. The substitution of coal dust for coke does not seem to make any material change in the condition of the lower part of the charge, nor alter the character of the slag or matte. In the absence of coke, however, the sulphur of the incompletely-roasted ore takes the place of carbon in the reduction of Fe_2O_3 to FeO and makes for greater concentration.

It has not yet been demonstrated that coke may be entirely dispensed with in lead smelting, or that carbon monoxide, from coal dust in excess of what the blast is capable of burning to carbon dioxide, will prove as satisfactory a reducing agent for lead oxide as coke.

All coals are not suitable for the manufacture of coke; but almost any coal may be used in the blast furnace. It is possible that peat or any other carbonaceous material, capable of being pulverized, may be successfully employed.

BOOK REVIEW.

The Mineral Industry, Its Statistics, Technology and Trade During 1917. Edited by G. A. Roush and Allison Butts, McGraw-Hill Pub. Co., New York. Price $10 net.

This is the 22nd volume of "The Mineral Industry." It contains information regarding the production of all countries for which statistics could be obtained. The greater part of the volume is devoted to the mineral industry of the United States; but foreign countries also receive considerable attention and an attempt has been made to present information concerning all mineral producing countries.

Many contributors have assisted in compiling the book, and most of the chapters include special articles by men well qualified for the task. The minerals are treated in alphabetical order, separate chapters being devoted to all the more important minerals or groups of minerals.

There are also special chapters devoted to, ore dressing and coal washing, data of the world's principal mines and mineral statistics.

As in previous volumes a wealth of information is included in this volume. It will be found referred to even more often than the earlier volumes owing to the many changes that are taking place in the industry owing to the war and to the return to peace conditions.

Mine Tracks, Their Location and Construction. By J. McCrystle. McGraw-Hill Book Co. Price, $1.50 net.

This little book is designed to furnish those in charge of trackwork and the laying out of trackwork with the necessary data in convenient form. The several chapters are headed: rail, ties, projection of haulage roads, grades, gravity grades, frogs and switches, locating the turnout and book of rules. As most books deal with standard-guage track, this one should be welcomed by those who want information about narrow-guage track.

Handbook of Mineralogy, Blowpipe Analysis and Geometrical Crystallography, by G. Montague Butler. John Wiley & Sons, New York. Price $3.50.

This book includes a second edition of "A Pocket Handbook of Minerals," and a first edition of "Pocket Handbook of Blowpipe Analysis," and "A Manual of Crystallography," 311 pages are devoted to the first part; 80 pages to the second, and 155 to the third. There is a separate index for each part. There are a number of tables for use in determining minerals by their physical properties.

The information given in this book is such as will help the user to identify minerals. The book is not intended to be used as a manual of mineralogy. An attempt is made to emphasize the features most useful for determination, rather than to state properties in detail.

Mill and Cyanide Handbook, by A. W. Allen. Charles Griffin & Co., London. Price 6s. net.

This is a book of tables for the use of those who are engaged in the milling of ores. The tables are arranged in sections under the following heads: technical chemistry and physics; weighing, measuring and estimating; experimenting and testing; crushing, regrinding and amalgamation; treatment of ore pulp; precipitation, clean-up and bullion recovery; conveyance of ore, pulp and solution; miscellaneous tables. In addition there are treatment charts, solution charts, clean-up charts, titration charts, report forms, construction costs and a glossary.

It should prove a useful handbook for the mill man.

Lightning River Gold Area and a Remarkable Series of Lava Flows

By A. G. BURROWS and C. W. KNIGHT.

In pursuance of instructions received from the Provincial Geologist, Dr. Willet G. Miller, the authors spent the summer of 1918 examining the recently discovered gold deposits in what has been called the Lightning river area, which lies directly south of Upper Lake Abitibi, Timiskaming district, Ontario. Our work covered an area of eight townships, the eastern limit of which was the interprovincial boundary between the provinces of Quebec and Ontario.

The boundary lines of the eight townships were surveyed during the summer of 1918 by Provincial Land Surveyor H. J. Beatty, but the lot and concession lines were not run. Consequently our geological mapping was, of necessity, more or less of a reconnaissance nature. The newly surveyed townships, Frecheville, Garrison, Harker, Holloway, Lamplugh, Marriott, Rand and Stoughton, were named after men well known in the mining and geological world.*

In this paper the account of the gold deposits and of other economic aspects has been written by Mr. Burrows, while the general geology has been described by Mr. Knight.

Gold was discovered in the Lightning river area in August 1917 by Messrs Howey, Cochenour and Willans. At that time it was a difficult matter for prospectors to get into this little-prospected area. During last summer, however, a rough road was built from near the Croesus mine into the Howey-Cochenour-Willans claims, this road being a continuation of the road which runs from Matheson to the Croesus mine. From Matheson, on the T. & N. O. Ry., to the Howey-Cochenour-Willans prospect, it is more than 40 miles by road. The area may also be entered by going to La Reine, north of Upper Lake Abitibi on the National railway. La Reine is 72 miles east of Cochrane, and is in the Province of Quebec immediately east of the interprovincial boundary. A gasoline boat may be taken at La Reine, and Upper Lake Abitibi reached by going down the Okikodasik river, a distance of about 5 miles. From the mouth of this river it is about 17½ miles southwest across Upper Lake Abitibi to the mouth of the Lightning River. A small gasoline boat may be taken about six miles up the Lightning river to the place where the river forks, at which point a trail about six miles long leads south directly to the Howey-Cochenour-Willans prospect.

The rocks in the eight townships covered by us consist almost entirely of greenstones, which are nearly always massive, and seldom are altered to schists. The greenstones consist mainly of basaltic or andesitic lava flows, interbedded with which are pink or grey acidic flows, probably for the most part rhyolites. All of these rocks have been considered to belong to the Keewatin series. We were fortunate in discovering in the southwest part of Holloway township an area in which the rocks are so little altered that we were able to recognize and map an orderly succession of lava flows, the tops and bottoms of the flows being found, and their thickness measured.

There are other rocks present besides these Keewatin lavas. We found here and there throughout the area dikes of feldspar porphyry and diabase cutting the Keewatin. There are also dikes or other masses of serpentine rock cutting the Keewatin.

In addition to these dikes there are larger intrusions of igneous rocks. For instance, Ghost mountain is made up of a great intrusion of diabase, presumably cutting the Keewatin lavas, about five miles long and more than a mile wide. This mountain rises some 660 feet above the Lake Abitibi, and is the most striking topographical feature in the area.

In Garrison Township there is an intrusion of pink hornblende granite, syenitic in places, a few square miles in extent, and also a much smaller, though coarse-grained and very beautiful syenite intrusion in Harker township. Both these masses intersect the Keewatin lavas.

Little is known about the age relationship of these various intrusions, one to another, since we rarely found them in contact with each other. We were able to prove, however, that along the shores of Upper Lake Abitibi certain of the feldspar porphyry dikes are older than certain diabase dikes. All of the intrusions, including dikes of porphyry, diabase, serpentine, and bosses of granite and syenite, cut, and are therefore younger than, the Keewatin lavas.

While most of the rocks in the area are igneous, there are small outcrops of iron formation, and also of volcanic tuffs and breccias. In the northern part of Garrison township, for instance, an iron formation strikes in an easterly direction. Its extent is not known since it occurs partly in low or swampy drift-covered areas. Iron formation also occurs along the south shores of Upper Lake Abitibi, while in Boundary bay we found some bedded tuffs and breccias with at least a thickness of 60 feet.

Carbonate rocks occur in the heavily drift-covered valley of the Mattawasagi (Teddy Bear) river, and in other places.

Lava Flows in Holloway Township.

In the southwest part of Holloway township, about 10 miles south of the shore of Upper Lake Abitibi, there is a remarkable series of lava flows, presumably of Keewatin age. The flows have been tited into almost vertical positions, and now dip at an angle of about 80 degrees to the south. Their upturned edges strike a little south of west. The time at our disposal was not sufficient to work out the length of the flows, but it was found that one of them extends for at least five miles in an east and west direction. The older flows occur at the north; in other words, younger flows are successively met with towards the south.

The lava flows indicate the great volcanic activity which existed in this part of the earth's crust in ancient times. Even our hurried work showed the presence of 14 distinct flows having a combined thickness of about

*Can. Min. Jr. May 1st, 1918, p. 146.

4,400 ft. In this thickness of 4,400 ft. there may be more than 14 flows, but owing to lack of time, and to the soil which covers the rocks in many places, we did not recognize more than 14 flows. Unquestionably the total thickness of the lava flows must be enormous, since similar volcanic rocks extend for ten miles to the north as far as the shores of Upper Lake Abitibi, and are reported by prospectors to occur for miles to the south.

The thinnest flow noted was about 27 feet, the thickest being hundreds of feet.

For comparative purposes it may be pointed out that the lava flows of the Keweenawan series in the Lake Superior region vary from about two feet to those which are 100 feet or more in thickness. In only two instances do they reach a thickness of 500 feet. The thin flows are not of great length, nor, for the most part, are the thicker flows. The greatest distance which a single flow has been followed is 30 miles. In some parts these Keweenawan flows in the lake Superior region have a total thickness of 23,000 feet.*

The volcanic rocks in Holloway township are indisputably stamped with the characteristics distinctive of lava flows. The most striking of these characteristics is the ropy, slaggy and at times half glassy nature of the tops of most of the flows. Sometimes the tops present a fragmental appearance. This appears to be due to the fact that the surface of the flows was the first part to solidify into a more or less thin crust, and that this solidified crust then broke up, and allowed the liquid rock from below to well up and cement the broken fragments. No doubt this process may have continued over and over again. Other characteristics, which we found for the most part abundantly developed, are the amygdaloidal, vesicular, scoriaceous, spherulitic and flow textures. Of common occurrence also are the pillow structures, which are developed in the basalts, but not in the rhyolites. Another interesting feature of these volcanic rocks is the occurrence of what are known as lithophysae, which consist of a series of concentric shells, resembling somewhat nested watch glasses.†

Columnar Structure in Diabase Dikes—Lightning River Gold Area.

In order to prove beyond question that we were dealing with a series of lava flows and not a number of parallel dikes we made a special search for the actual tops, or surfaces, of the flows. In nearly all of the fourteen flows we found these tops. The bottoms were also generally found. It was seen that the dense, fine-grained bottoms were chilled and frozen against the

*U. S. G. S. Monograph 52, 1911, pp. 386, 408, 409.

†Pirsson, Rocks and Rock Minerals, p. 264.

Prospectors in Lightning River Gold Area, Sept., 1918, at Howey-Cochenour-Willans Claim.

ropy and slaggy tops. If further proof were needed, to show that we were dealing with lava flows, it is found in the study of each individual flow. For instance, the bottom of the basaltic flows are generally dense, fine-grained, sometimes amygdaloidal rocks; as the centres of the flows are approached the rock becomes coarser in grain, even as coarse as a medium-grained diabase. As the top is approached the flow becomes finer in grain, amygdules begin to make their appearance, and finally the rock assumes the ropy, slaggy and scoriaceous features which are characteristic of the surface of many lava flows.

The thickness of the ropy tops varies in the different lavas; in the flow in front of the office of the Howey-Cochenour-Williams gold prospect the ropy surface makes up almost half of the flow, the ttoal thickness of the flow itself being about 27 ft. In other instances these ropy surfaces attain a thickness of as much as 40 ft., in which cases the flows themselves are hundreds of feet thick. Sometimes the ropy surface is only a few feet thick.

The lava flows briefly described above are in an unusual state of preservation in so far as their textures and structures are concerned. The ropy, slaggy, scoriaceous, amygdaloidal and other characteristics are all easily recognizable. This is due to the fact that the rocks, although they have been tilted up into almost vertical positions, have not been subjected to those severe processes of metamorphism which alter them to schists. They, as a consequence, retain their massive characters.

Of the fourteen flows which were worked out three are acidic varieties, which may be called, in a general way, rhyolites, while the remaining eleven are basalts or andesites. Two of the rhyolites are light pink in color on weathered surfaces, while the third rhyolite has a pink to dark grey, or at times greenish, color. The basalts are all dark green in color.

The discovery of these flows in Holloway township is of unusual interest. In no other area of Keewatin rocks in the Province of Ontario has there been found such an orderly succession of flows. Of course it has been believed that the Keewatin was composed of a series of lava flows, since the textures of the rocks pointed clearly to their volcanic nature. Nowhere, however, had the tops and bottoms of the flows been found, and the flows mapped in detail. The Keewatin

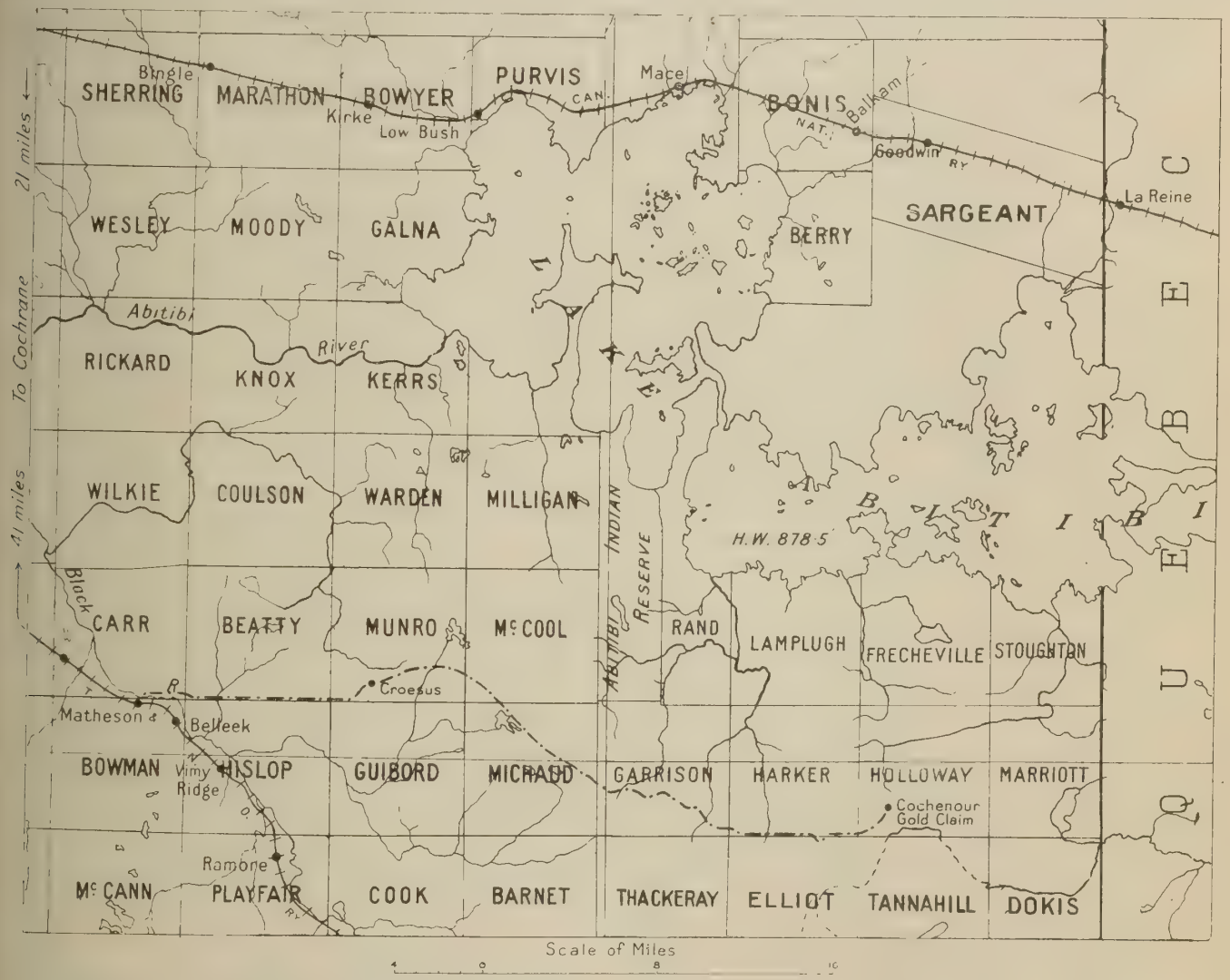
was simply known as a chaotic tangle, consisting largely of volcanic rocks, to which stratigraphic methods could rarely be applied.

Whether the flows in Holloway township really belong to the Keewatin, or to a younger series of rocks, cannot be dogmatically stated. Until it is proved that they do belong to a younger series, we prefer, in the meantime, to class the flows as Keewatin in age.

Economic Geology.

The chief interest in the area centres in its gold discoveries, and while a few claims have been partly prospected, on the whole only a limited amount of work has been done, due to the lack of prospectors and the distance of the area from a railway.

Most of the work has been done in the southwest



part of Holloway and the southeast partof Harker, these townships being adjacent.

Howey-Cochenous-Willans Claim.

Work on the Howey-Cochenour-Willans claim, No. 7135, has been largely confined to an examination of the vein in which the original discovery of gold was made in August, 1917. This vein has been traced by means of pits and trenches a distance of 175 ft. At the westerly exposure it is in the basalt, and at the easterly exposure in the rhyolite. At the west outcrop in the basalt an incline shaft has been sunk on the vein where the dip is 23° south. When the property was last visited by us the shaft had reached a depth of 35 ft. and the vein was still in the basalt, which rock lies to the north of rhyolite, the strike of the contact of the two rocks being to the south of west and the dip being about 80°S. From information furnished by Mr. J. W. Morrison, who was manager of the property at that time, it has been learned that when the shaft penetrated the contact of the basalt and rhyolite the low dip of the vein was maintained, and the contact between the rocks has been displaced a distance of four feet on the plane of the vein. This evidence points to the formation of the vein along an inclined fault that intersected the rock formations.

The vein structure, as revealed in the shaft to a depth of 35 feet, shows a main persistent quartz vein, varying in width from an inch to 10 or 12 inches, with an average width of about 4 inches. Roughly paralleling this main vein there are a number of narrow quartz veinlets usually less than an inch in width and more or less discontinuous, the whole partaking of the character of a sheeted zone produced by shearing that accompanied the formation of the fault. This zone varies in width from about 2 to 3 ft. The quartz veins carry considerable calcite often of a pink color, and also pyrite, chalcopyrite and zinc blende. In the main vein the pyrite, which is the most abundant sulphide, frequently occurs in a roughly banded arrangement, parallel to the walls, and is also concentrated between the quartz and the wall rock. Fragments of country rock occur in the vein and are said to be more numerous as the contact between the basalt and rhyolite is approached.

The gold usually occurs in a fine condition with the

pyrite, but samples from the main vein often show gold in the quartz visible to the eye.

The rock adjacent to the veins has been mostly replaced by silica and carbonate solutions, accompanied by iron pyrites. Samples of the replaced rock effervesce strongly with the acid. Away from the veins the original lath-like structure of the plagioclase feldspars is well preserved.

The shaft is reported continued to a depth of about 70 ft., and work was stopped after the rhyolite had been been penetrated for 20 ft.

The rhyolite contains scattered crystals of iron pyrites and on the surface to the south of the shaft there are numerous loose fragments of the rock. Native gold has been observed in some of the fragments. We were informed that from a number of assays of the surface rhyolite an average assay value of about $1.50 in gold per ton was obtained. From a few samples taken by us we were able to confirm the presence of low values in the rhyolite. Similar low values have been reported in this rock from a number of places along the band of rhyolite for 5 miles. Some work has been done on quartz xeins that carry iron pyrites occurring in this or a parallel band of rhyolite.

Taylor-Horne Claim (7261)

This claim is located in Holloway township adjacent to the west boundary of the township. Here there is a quartz vein with strike. N 82° E. that can be traced for 125 ft. east from the boundary line to the edge of a bluff rising from the drift. The vein dips 75° S., is narrow and varies greatly in width. At the easterly exposure it is 8 inches wide where a shallow pit has been made. At another point it is 4 inches in width and well mineralized with iron pyrites, zinc blende and galena. Some visible gold was observed at one point in the vein. The enclosing rock is altered basalt. Some selected material from this vein gave on assay to $4.40 in gold.

Cochenour Claim (in Harker township).

This claim joins the Taylor-Horne claim on the west side of the boundary line. Work has been done on the strike of the Taylor-Horne vein, which towards the west diminishes in width. On the Cochenour claim there is a mineralized zone, but with very little vein quartz exposed. The basalt, which is the country rock, has been greatly impregnated with silica and carbonate solution and iron pyrites over a width of from 5 to 10 feet. A little native gold was observed in a joint plane in the altered rock 230 feet west of the boundary.

McDonald Claim (7324).

On the McDonald claim some surface work has been done on 3 quartz veins in the rhyolite. These veins from 2 to 10 inches in width carry iron pyrites and copper pyrites. This prominent vein, which strikes N. 15° E. and dips 75° easterly, has been traced on the surface for 150 ft. Some native gold has been reported from this vein and values of $8.40 and $7.60 in gold were obtained from samples of quartz and rhyolite, carrying iron pyrites.

Reference has been previously made to the general character of the rocks in the area south of Abitibi lake. These rocks, largely of a basic character, basalt and diabase, are very similar to the massive basic rocks that occur in the vicinity of the Croesus mine in Munro township, where in 1914 a quartz vein carrying the richest gold ore yet found in Ontario was discovered. It is possible that in the area to the east, which so far has been little prospected, other gold deposits of a similar character may be found.

Magnetic Declination in Holloway and Frecheville Townships.

Along the north boundary of Holloway township the compass was found to have an unusual variation at and near the contact of an intrusion of serpentine which cuts Keewatin lava. The Keewatin here forms a prominent hill known as Lightning mountain about two miles east of the Southwest corner of Frecheville township. At the foot of Lightning mountain, on the southwest side, the mass of serpentine referred to is found striking about west 30° north. The greatest variation of the compass is 95° west of the true astronomic north, and occurs about at the contact of the serpentine and Keewatin. It is evident that the variation is due to the serpentine rock, since the variation falls as one leaves the contact. The only apparent cause for this unusual declination appears to be due to the presence of a very little magnetite in the serpentine. Analyses of the serpentine for platinum, chromium and neckel gave negative results.

We also found a heavy magnetic declination along the south boundary of Rand township in a swamp. The declination is as high as 36° west of north astronomic The south boundary of this township being drift-covered it was not possible to discover the cause of the declination. However, there is an iron formation about a mile south of the boundary. If this extends north, below the drift, it probably would account for the declination.

Surveyors while engaged in outlining or subdividing townships, occasionally refer in their notes to unusually high magnetic declinations, indicated by local disturbance of the compass needle, that is due to the proximity of such deposits as magnetic iron ore, serpentine, or pyrrohotite. Reference to local disturbance in the notes accompanying the survey of Reaume led prospectors to examine this township, which is largely covered with drift, resulting in the discovery of some deposits of chrome-bearing serpentine. The discovery of the Alexo nickel mine is directly due to the reference by surveyors in their notes to the unusually high magnetic declination observed in the townships of Dundonald and Clergue. Alex. Kelso, a prospector, knowing the significance of the unusually high magnetic declinations referred to, carefully examined the area, and found the deposit of nockel-bearing pyrhotite in serpentine afterward known as the Alexo nickel mine.

Mr. N. T. Bothwell, who has been in charge of gold-quartz mining operations in Alaska during the past summer, is in Winnipeg for a few days. Mr. Bothwell intends to continue operations as soon as the spring break-up comes.

Mr. J. B. Tyrrell has been nominated for the presidency of the Canadian Mining Institute for the coming year. Mr. Tyrrell is chairman of the Toronto branch of the Institute.

Mr. C. E. Smith has not accepted the nomination for election as a councillor of the Canadian Mining Institute for the coming year. It is probable that Mr. Geo. Mackenzie, of Ottawa, will be nominated.

Mr. T. W. Carvers is at Copper Cliff. He is interested particularly in the use of coal dust as a substitute for coke in blast furnaces.

The Graphite Industry

By CHARLES SPEARMAN.*

The mineral graphite, generally speaking, is widely distributed throughout the world, deposits being found in Canada, United States, Mexico, Ceylon, Siberia, Madagascar, Greenland, Norway, Finland, etc.

Graphite crystallizes in the rhombohedral division of the hexagonal system, usually in six sided tabular crystals which at times may have the appearance of being circular or elliptical in outline; may also occur foliated, radiated or columnar; may be granular to compact, earthy, scaly or flaky; has a perfect basal cleavage, greasy feel, metallic lustre; is opaque, flexible but inelastic, steel gray to black color; hardness is 1-2; Sp. gr. 2.24. Graphite is essentially carbon, but in its purest form contains volatile matter and ash usually less than 1%. The streak is black. Graphite is a conductor of electrically. Its fusibility is probably about 3,000 deg. C. The mineral is combustible at 650-700 deg. C. Crystalline graphite may be oxidized to graphitic acid $C_{11}H_4O_5$, while the artifical amorphous substance cannot.

Amorphous carbon is produced commercially from coke by the Acheson process. Schungite is the name applied to an amorphous variety of carbon sometimes found in the schists. There is considerable difference of opinion regarding amorphous graphite occurring in nature. Many contend that the so-called amorphous carbon is really flake graphite deposited in microscopic flakes or scales, or larger flake reduced to a state of fine subdivision by dynamic action, such as deformation of the deposit. A great many specimens of so-called amorphous carbon found in nature, examined by the writer, tend to bear out the above contention i.e. that which appears as amorphous carbon to the unaided eye actually shows the condition of a groundmass of microscopic crystals or flakes containing therein many flakes which are relatively large.

Some of the richest known Canadian graphite deposits are found in Eastern Ontario and Western Quebec or roughly speaking within a radius of one hundred miles of Ottawa. Most of the graphite in the above area occurs in large disseminated flakes of such size that practically all rest on a 60 mesh standard screen, the only exception to the above being the Black Donald Mine graphite at Calabogie, Ont. where a great deal of the flake in certain parts of the deposits is very small Judging from hand specimens it appears as though most of this fine flake would rest on a standard 90 mesh screen.

Flotation Process Replacing Old Dry Process.

About half a dozen miles for the concentration of graphite were built from time to time in the above area, some dating back to twenty years. In 1916 all were closed down, with the exception of one with a small output in Buckingham Tp., Que. and the Black Donald at Calabogie, Ont. The others attempted to concentrate by the dry process and failed. In 1916 or thereabouts, flotation began to play an important part in the concentration of graphite ores, and with such success that within a short time there will be flotation concentrators replacing the old dry processes in the various mills.

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The average graphitic carbon content of the Black Donald ore is much higher than that of any within the area mentioned, averaging about 30-35% graphitic carbon; the remaining properties on which, comparatively speaking, little development has been done outside of open cutting, should average about 8% or better graphitic carbon if developed to that end. The Globe Graphite Mining and Refining Co., Ltd., at Port Elmsley, Ont. stands second to the Black Donald as far as development work is concerned. A full description of the last named property was published by Mr. M. E. Wilson of the Geological Survey in Summary Report, 1917, Part E.

According to Lindgren, graphite may originate in several ways; (a) it may for an integral part of rock magmas and crystallize with the rock, (this type is seldom of economic importance).

(b) it may be formed by the recrystallization of carbonaceous matter in metamorphic sedimentary rocks, (c) it may be formed by deposition from gaseous carbon compounds such as carbon monoxide or cyanogen compounds, perhaps with metals, and usually found in narrow veins.

In the Ontario-Quebec area referred to above, the graphite occurs usually in crystalline limestone adjacent to or at the contact with intrusive rocks of the acid type, generally pegmatites or their derivatives, i.e. rocks formed by the action of the intrusive on the intruded rocks. These deposits are characterized by their relatively large dimensions, 10′-100′ wide, where development has been carried out by diamond drill or otherwise. The graphite is associated with mica, pyroxene, scapolite, wollastonite, pyrite, quartz, etc. The deposits are as a rule quite irregular and more or less varied in carbon (graphitic) content. Regarding the origin, it would appear in most cases to be accounted for by a combination of (b) and probably (c) types above mentioned, acting upon the already deformed or disturbed country rock. The major crustal movement which made the intrusive possible incidentally caused zones of weakness adjacent to the zone of major movement, which zones were subsequently acted upon by emanations from the intrusive magma, probably pneumatolitic or nearly so in character, causing recrystallization of the carbonaceous matter of the crystalline limestone within the influence of the emanations, into graphite. The presence of quartz adhering to some of the flakes would indicate transportation of some material at least from the intrusive magma with possibly some graphite formed by the deposition of gaseous carbon compounds, (c) type above, of the intrusive. From the above it would follow that the size of the deposit would depend directly upon the extent or degree of deformation adjacent to the intrusive and the richness of the deposit depends directly upon the duration of the action. The duration of the action depends more or less upon the volume of the intrusive magma.

In the United States the greatest producing area is in Alabama, in the Ashland district of Clay county where the graphite occurs in a metamorphosed mica schist much weathered and decomposed so as to render mining comparatively easy. The deposits are from 10′ to 80′ wide, the flake is a fair average size; but the deposits are on the whole low grade averaging about

3-4% graphitic carbon. In Clay and Coosa counties there are about 60 mills with a rated total of about 7,000 tons per day, many operating, the remainder under construction. New York State is the second largest field in the U. S. Generally speaking the graphite occurs there in pre-Cambrian crystalline schists of sedimentary origin and averages about 5% graphitic carbon.

In Ceylon the graphite occurs in veins from 4" to 12" wide in a fine grained acidic or basic gneiss intruded by granites and pegmatites. The ore is high grade and is sorted at the mine and as marketed runs over 70% graphitic carbon. The graphite occurs in these relatively narrow veins in a fibrous or radiated structure with the long axis of the fibre normal to the walls of the veins. This graphite is remarkably pure and is much used for crucible manufacture.

In 1917 Alabama produced about 3,000 tons of graphite; New York about 2,500 tons, Pennsylvania and other United States areas 450 tons. The production for 1918 for the above areas is approximately the same as for 1917. Ontario produced over 3,000 tons in 1917 and about the same in 1918, practically all of which came from one mine, the Black Donald at Calabogie, Ont. Importations from Ceylon to United States in 1917 were 25,000 tons much of which was used to mix with domestic flake for the manufacture of crucibles. In 1918 this importation was greatly diminished by the placing of an embargo on the Ceylon product by the War Trade Board. In 1917 Madagascar produced 35,000 tons of which England and France used 28,000 tons. From 3,000-4,000 is produced artifically at Niagara Falls by the Acheson process and which is "deflocculated" and is used in oil as a lubricant.

Graphite for the market is usually graded according to purity and size of flake. No. 1 flake should be no smaller than 90 mesh standard screen, over half of which should rest on a 50 mesh standard screen, all or nearly all pass through a 16 mesh standard screen, and contain 85-90% graphitic carbon or better. No. 2 flake should rest on 120 mesh standard screen and pass through 90 mesh standard screen and contain 75-80% graphitic carbon, while all flake which passes through a standard 120 mesh screen is known as No. 3 and contains from 40-70% graphitic carbon. No. 1 domestic flake in 1918 sold at 17-22 cents per pound; No. 2 domestic at 13-15 cents per pound while the lower grades sold at from 3-11 cents per pound. The present price is somewhat lower than the above for domestic product, but with a better domestic grade going on the market it is likely that the price will remain quite steady.

A great deal of the domestic No. 1 flake is used in the manufacture of graphite crucibles, usually mixed with Ceylon graphite in the proportion of 30% domestic to 70 per cent Ceylon Graphite flake for crucible manufacture must meet with the specifications enumerated above and, in addition, must contain little or no basic gangue which would flux the clay which is used in the art. The flake must not be thin, light or fluffy or it will not shake down to the requisite density when in bulk, and will thus possess too great a percentage of voids which must be filled with clay in the manufacture of the crucible. A crucible with too much clay in its make up loses its conductivity for heat and requires a greater heat to carry out the operation and consequently at a greater cost. Hence the more dense the mass of finished flake taken as a whole the better suited it is for crucible manufacture, other features being equal. In explanation of the above I would quote the following test; 100 grams of Alabama No. 1 flake, shaken down, occupies about 150 c.c.; the same weight of Canadian No. 1 flake occupies about 135 c.c. while the same weight of Ceylon flake occupies about 91 c.c.; hence the Ceylon product makes a crucible with more graphite in its make up than could be made from the other products, for the same size of crucible. Experiments carried out on a commercial scale by the writer have resulted in the obtaining of a Canadian crucible flake, practically free from basic gangue and when subjected to the above standard test occupying about 101 c.c.. It can be made still more dense. This should make an excellent crucible stock as far as domestic flake is concerned, and further research along this line would mean much towards decreasing foreign importations to this continent, and greatly improve the American markets and assist the American industry.

Much graphite is also used in paint manufacture foundry facings, pencil manufacture, polishing powder, as an adulterant in fertilizers, etc.

From the preceding brief general summary of the graphite industry it is apparent that the Canadian area referred to has graphite deposits which are valuable, and field examination reveals the advisability of further exploration and development in order to bring the area into prominence as a world producer. This statement is based on evidence of numerous large and relatively high grade deposits already outcropping or shown by limited development work already done; nature of the flake contained in such deposits which is unexcelled commercially; accessibility to transportation by rail and water, cheap power, etc. Then there is the industry of manufacturing graphite products within the area, which merits a great deal of attention on account of the foregoing facilities. In fact this area presents qualifications for the development of the industry which no known area can duplicate.

TEMISKAMING BUYS DOLLY VARDEN.

Toronto, Feb. 3.

The shareholders of Temiskaming, at their annual meeting yesterday, consented to the proposal of the directorate, to extend the operations of the company, by taking over the Dolly Varden and Wolfe silver mines in British Columbia. These mines have been handicapped for some time by lack of finances, and Temiskaming has entered into an agreement whereby operations will be resumed. The purchase price of the property is $900,000, but the obligation to the former holders of the mine is only $450,000 because of the liabilities that Temiskaming has to assume. A narrow-gauge railway extending from the coast to Alice Arm to the Dolly Varden property is to be completed, and all debts will be met by the purchasers. According to the agreement, the vendors receive no payments on the purchase price, before the Temiskaming Company recoups itself for this outlay. The vendors will only be paid out of the profits.

The known ore reserves are said to be heavy, the properties, it is stated, having over two million ounces of positive ore in sight. The two properties lie within nine miles of each other, and both are said to be rich and extensive.

Temiskaming's annual statement was received and adopted at yesterday's meeting, and the old Board of Directors were re-elected.

Special Correspondence

NORTHERN ONTARIO.

Payment Made on Patricia.

A large cash payment on the purchase of the property of the Patricia Syndicate, at Boston Creek was recently made, according to official information. Advice is also to hand that an early resumption of operations at the property may be looked for, owing to the improved economic condition and better supply of labor. The small mill on the property was closed down early in the winter owing to the difficulty in securing fuel for its operation. Last week it was announced the Mining Corporation of Canada and also Detroit interests were negotiating for the purchase of the property, but so far nothing definite has transpired.

Exploring Skead Township.

Evidence points to a considerable increase in mining activity in Skead Township area during the coming spring and summer, and even now a number of properties are being worked in a more or less extensive way. Gold has been found in various sections of Skead township and in some instances spectacular gold values were found. Chief among the mining operations under way in the district at present is the Skead Gold Mines Limited. This company owns more than a score of claims on which work has been commenced. The Wisconsin Mining Company owning property in the district has engaged a number of men for the putting in shape of the mining plant, with the intention of resuming operations early in March. Plans are under way for a fairly extensive exploration of the vein system. Owing to the distance the new field lies from the railway, the development of the district has not been as rapid as the showings would appear to warrant. The coming summer, however, appears to mark the beginning of an aggressive period of development and those interested in the district are very optimistic at the outlook.

Will Resume Work at White Reserve.

Tenders are being called for 150-ft. of drifting at the 140-ft. level of the White Reserve property, in the Maple Mountain section. Arrangements are being made for an early resumption of mining operations at the property. Considerable development has been accomplished on this property and results to date have been very encouraging.

Development Plans for Miller-Independence.

The work of surveying and sampling the Miller-Independence Mines at Boston Creek has been completed. While no official report of the extent of the rich orebodies as so far opened up has been given out, it is stated the assays check up well with previous optimistic statements made. The consulting engineers have been so favorably impressed as to advise the sinking of the present shaft to lower levels. The recommendation is to the effect that the present shaft be continued from the present level of 200-ft. to a depth of at least 500-ft., with large stations at the 300 and 400-ft. levels, from which points lateral work is advised. The management is making preparations to carry out this work with the least possible delay. The shaft from the surface down to a depth of 40-ft. is being lined up with the remaining portion of the working which has reached a depth of 200-ft., and which has an incline of about 51 degrees. A concrete cellar will be placed at the mouth of the shaft. Two additional drilling machines have been placed on order and will be used for the purpose of sinking the shaft, while the present machines will be free for the carrying on of further development work. The shaft will be timbered and additional machinery installed to facilitate the hoisting of the ore. The shortage of labor appears to have bene overcome and as ample funds are available for the development of the property and erection of a large mill, there appears to be nothing to prevent the carrying out of the large plans of development recently outlined, and the placing of the property on a producing basis in a reasonable time. The small mill installed on the property has been satisfactory as a testing plant, for the testing of the ore in the mine as the various levels of the property are opened up. The high grade nature of the ore makes it unwise to use the present milling system for treatment. It is thought this plant will eventually serve as a customs mill for a number of the smaller properties opening up close to the Miller-Independence. The increasing importance of developments at the mine presage a bright future for the property at the coming spring and summer will see long strides made in the proving of the rich orebodies, the limits of which at the present time can only be guessed at. From what has been so far proven it is the opinion of many prominent mining men that the Miller-Independence operation is one of the most important in the annals of gold mining in the Dominion of Canada.

Gowganda.

A deal for the Walsh property in Gowganda, involving a sum said to be well up in six figures is under way. This silver property was under option to the Crown Reserve Mine of Cobalt and development work was carried to a depth of 200-ft. Owing to a very large payment falling due and terms not proving satisfactory, the option on the property was allowed to lapse. The Walsh lies adjacent to the famous Miller Lake-O'Brien mine and the geological conditions are very favorable for the encountering of silver deposits of importance.

Teck-Hughes Increases Output.

The December output at the Teck-Hughes Mine in Kirkland Lake is the highest in the history of the company. During the month some 2,035 tons of ore were treated, from which an average of $10.12 per ton was recovered. It was officially stated that the grade of ore to be treated in the future at the Teck-Hughes would be higher than in the past. The reason given for this is the fact that the ore encountered in the course of development has been conveyed to the mill and does not represent the average contained in the main orebodies of the property. One orebody in the mine has been opened up for a distance of 400-ft. and a depth of 600-ft., showing a width of thirty-seven feet at its widest point. It is further stated officially that one of the main orebodies of the mine has an average value of between $11 and $12 per ton. The mill on the property is designed to treat between 100 and 120 tons of ore daily when brought up to full capacity. The outlook therefore is for an output of upwards of $30,000 per month when operating at capacity.

Porcupine V.N.T.

Reports to the effect that the Porcupine V.N.T. property was about to be re-opened have been officially denied. Following the curtailment of operations last year, the lower workings of the mine were permitted to fill with water. It is therefore not probable that any action towards a resumption of work will be undertaken until the spring arrives.

McRae Porcupine.

Arrangements are understood to have been about completed for the further opening up of the McRae-

Porcupine property in the township of Deloro. Considerable work has previously been done on this property, and the results have been promising.

Porcupine-Keora.

Plans have been completed for a resumption of operations at the Porcupine-Keora property in the northern part of Whitney township. The preliminary work to be undertaken will consist chiefly of diamond drilling with the conclusion of which underground work will be started. Considerable success was met with in the diamond drilling of the Keora upwards of two years ago, when this work carried to a depth of 800-ft. Orebodies of a substantial width which are said to contain commercial values were cut.

Hunton-Kirkland.

It is understood interests closely identified with the McKinley-Darragh mine are connected with the purchase and development of the Hunton-Kirkland property at Kirkland Lake. Plans are under way for the installation of a steam plant for the exploration and development of the property, and work is to be commenced early in February.

Cheaper Supplies.

Striking evidence of the decline in the cost of mining materials is borne in the fact that steel plate which not long ago was on the market at 12 cents per pound can now be purchased for six cents. Copper wire has also declined nine cents per pound in the past few weeks.

McKinley-Darragh's new orebody.

The McKinley-Darragh mine ore shoot recently discovered at the 300-ft. level of the property near the old Princess property of the LaRose Mine continues to prove up well under development. Some rich ore occurs along the vein which has been opened up for a distance of fifty feet, in addition to the high grade being encountered there is a considerable tonnage of low grade mill rock in the wall rock. It is expected the vein will be picked up in the level above the present point of operation.

Good Ore at Adanac Mine.

The persistent efforts of the Adanac Mining Company have at last been crowned with success. The ore shoot at the 310-ft. level has been opened up for a distance of fifty feet, the vein showing a uniformity of width during the last few rounds of shots, and has every appearance of continuing for a considerable distance. The high grade portion of the vein runs from six inches to one foot in width, carrying values from one thousand ounces up to five thousand ounces to the ton, with an average value of approximately one thousand five hundred ounces to the ton. Besides this high grade vein the wall rock on both sides of the vein carries good milling ore, considerable leaf silver and ruby silver being in evidence for several feet from the main portion of the vein. Arrangements have been made for the hauling of ore to the Temiskaming mill which adjoins the Adanac, and a trial run of between fifty and sixty tons will be made as a preliminary to steady production. The length and breadth of the present ore shoot affords ample opportunity for the commencement of stoping operations, and this work will probably be commenced at an early date. An additional machine is to be employed in the mine next week which will increase the speed of development. A contract for the hauling of the ore to the Temiskaming mill has been let at 60 cents per ton for the time being, but it is expected a considerable reduction in this rate will be effected in the near future.

Tough-Oakes.

It is anticipated that any possible further litigation in the affairs of the Tough-Oakes Mining Company of Kirkland Lake, will not hinder the affairs of the Company. It appears to have been definitely established at the recent annual and special meeting of the company that the Foster control was at an end. However, it is possible the present controlling interests of the company will demand an accounting of the affairs of the concern during the past three years in which control was in dispute. The present directorate of the company holds that the former directorate are solely and entirely responsible for the present condition of the property, and the present directors have not had the opportunity of investigating the situation. Any dispute along this line or legal action taken should not hamper the development of the mine from this date forward and it is expected the development of the mine and subsequent opening of the mill will soon result in large earnings.

Hollinger's Construction Program.

A large construction program is being mapped out by the Hollinger Consolidated Gold Mines at Parcupine, including the immediate erection of some fifty houses for the accommodation of workmen. The early commencement of an additional 100-ton unit to the present 2,800-ton mill is also expected to be considered before long. Since the commencement of the war a 1,000-ton unit has been added to the plant, and an additional 1,000-ton unit will be installed. This work had been planned previous to the war. However, lack of labor and high cost of material consequent of the war led to the latter addition to the mill being left until a more opportune time. At the present time men are pouring into Timmins in large numbers, and housing accommodation in the town is being taxed to the limit. The whole district is teeming with activity and the probability is that with the coming of spring conditions warranting the construction of the extra milling facilities will have arrived and the work should be under way early in the summer. The Hollinger mine is the mainstay of the town of Timmins and with the enlargement of this and other properties in the district, the town of Timmins is now a thriving hive of industry. There is every evidence that the present town will soon be swallowed up in a big city, which the mining industry and its demand for labor will create. Even now the number of new buildings being constructed and planned will go a long way towards changing the present appearance of the town and giving it a long step towards cityhood.

Mining Commissioner T. E. Godson, K.C., has completed his January sitting in Haileybury, and returned to Toronto.

Mr. A. Brant, manager of the Porcupine-Keora Mine in the township of Whitney, went north last week to reopen the mine.

Plans are being arranged for the resumption of work on the Baldwin property, near Kenogami station in the Kirkland Lake district.

Plans are being made to resume work on the Murray-Mowgridge property, in the Wolfe Lake district a few miles east from Bourke's Siding.

BRITISH COLUMBIA.

Testing Breathing Apparatus.

Acting on instructions from Hon. Wm. Sloan, Minister of Mines, the Chief Inspector of Mines of British Columbia has arranged for a series of practical tests of the efficiency of the Gibbs Mine Rescue Apparatus and the Paul Breathing Apparatus. These will begin on Tuesday, the 28th of January, at the Government Mine Rescue Station at Nanaimo, and continue until the efficiency of the machine is thoroughly demonstrated.

Activity at Trail Smelter.

Notwithstanding the present unsettled condition of the metal market, Trail, B.C., the home of the smelting plant of the Consolidated Mining & Smelting Company of Canada, is as busy now as it was some months ago, and has more men on its payroll. The explanation of this, in a few words, is that the management is preparing for the time, expected soon, when the work of reconstruction will make itself felt in the demand for the product of the plant.

Plant for Treating Tailings.

To be ready to take the fullest advantage of the shortly looked for readjustment and the return to the normal, there is considerable to be done at Trail. This was forecasted in the annual reports of the company's officials, which were issued recently.

One of the most important things in mind is the construction of a concentrating plant in connection with the zinc plant for the purpose of treating the tailings of the Sullivan mine and other silver-lead-zinc ores after they have passed through the zinc electrolytical process. There is an immense quantity of this residue which has been accumulating ever since the process for the recovery of zinc was installed, because there was no known, economically practical method, of extracting the lead-content. Both Messrs. J. J. Warren, the Company's General Manager, and S. G. Blaylock, his assistant, have stated that this vital problem has been solved by their own chemists. If this is so, and officials in question are evincing their faith by proceeding with the necessary installations, its importance to the mining industry of Eastern British Columbia, where the refractory ores of the Sullivan mine are found repeated in many other promising properties, can scarcely be over-estimated. It is said that the method by which the said tailings are to be handled is a combination of the concentration and leaching processes. Its success means the continued production of spelter at Trail at a cost which will permit in all probability its being placed on the market in competition with the products of other American smelters which are handling less complex ores because the lead content also will be available. This, therefore, is one of the works that the Trail Smelter management is engaged in and which, to some extent, accounts for the activity referred to at the outset.

Enlarging Copper Refinery.

A second matter, and also one of first importance, which is receiving attention is the enlargement of the copper refinery to provide for a daily minimum capacity of 50 tons. Present facilities permit the producing of not more than 20 tons a day. The concrete footings for this structure have been placed and the work wil go ahead as soon as weather permits.

The extension of the copper refinery plant at Trail is the logical outcome of the company's policy in acquiring the Voight copper claims, Copper Mountain, B.C. Of course, considerable development is necessary before this property begins to produce on a large scale, but, in the meantime, the Smelter is assured the concentrates of the Canadian Copper Corporation's mill at Allenby (near Princeton) B.C. The latter concern, which has made a large investment at Copper Mountain in the development of claims which adjoin the Voight claims (so-called), and the construction of a branch line from Allenby to the property and a mill at Allenby, has entered into an arrangement for the shipment of concentrates to Trail. Active work in the extraction of ore at this mine should commence within a few months so that the Trail Smeltery, with such a source of supply in addition to what is available from its own and custom properties, will have no difficulty in finding material for the augmented facilities of its copper refinery.

Alice Arm District.

The Alice Arm District of British Columbia is expected to develop into one of the large producing sections of the Province before long, it being the opinion of mining men that the Dolly Varden mine, which now is inactive because, owing to the failure of the Taylor construction company to carry out its contract relative to the construction of the railway from the coast to the mine, both the railway and the mine are tied up. The former is practically complete. When work ceased on it last autumn only five more days work would have found the terms of the charter complied with but, although within reach of the goal the company could do no more, and the charter has been allowed to expire. Considerable sums are owing to the workmen, and there also are large accounts outstanding for material. The owners of the mine have offered, according to well authenticated report, to pay these off providing the Provincial Government will renew the charter, which is an indication of faith in the mine very encouraging to all interested in the minerals of the section. It is confidently expected that the Government will take the action sought, in which event the line will be finished and its operation commenced. This, it is pointed out, will not only permit the Dolly Varden mine to undertake shipment of ore and further development, but will result, through providing transporation facilities, in opening up many other promising mining properties of the district.

Galena Farm Mine.

Eight carloads of ore have been shipped from the Galena Farm mine since Mr. W. J. Casey, of Los Angeles, Cal., became lessee of the upper workings, according to a report from Silverton, near where the property is situated. Three carloads were zinc concentrates and the remainder crude lead-silver, and all were produced from ore discovered in recent months above the intermediate tunnel level. The lead-silver ore has an estimated net value of $4,000 to the carload. The new ore is contained in a body 11 to 14 feet wide, disclosed in raises 150 feet apart on the intermediate level. The 14 feet of ore in the west raise includes two and a half to three feet of a shipping grade, while the 11 feet in the east is of milling grade xx. Drifts are proceeding on ore from the tops of these raises, which are less than 100 feet in heighth, eastward from the east raise and westward from the west raise.

Cork-Province Mines.

Cork-Province Mines, Ltd., operating mines and mill on the south fork of the Kaslo River, Kaslo, B.C., has concluded arrangements for refinancing, and expects to start operations early in the spring with sufficient capital to sink the main shaft 200 feet deeper and drive the main tunnel level into the third vein, which is particularly promising on the surface, and will be tapped at vertical depth of 700 ft. A letter has been addressed to the stockholders by the management stating that all metallurgical problems have been overcome, and that a successful run is confidently expected when operations are resumed. Running full time it is figured that the mine will earn a monthly profit of $12,000, based upon a lead and zinc concentrate output of 390 tons, worth $20,294 gross. These figures, it is explained, have been prepared with due allowance for the decline in price of lead, and present net value of zinc concentrate shipped to Trail, where no payment is made for silver content.

Developing Fluorspar Near Grand Forks.

Progress is being made in the development of the fluorspar property of the Consolidated Mining & Smelting Co., near Grand Forks, B.C. Eighty-two men now are employed there. The tram line being built to convey the ore from the mine to the bunkers for shipment is nearly completed, and is expected to be ready for operation this month. At the bunkers a mill is being installed which will grind the ore to almost flour-like consistency before shipment. The mill site is to be connected with the Kettle Valley Ry. by a branch line which is under construction.

COAL RIGHTS ON VANCOUVER ISLAND.

The Government of the Province of British Columbia has announced that it will stand by the settlers of Vancouver Island, who are claiming the coal rights in connection with the lands they occupy providing they can prove that such claims are based on sound premises. It will be recalled that the Dominion Government last year disallowed the Provincial Act giving the settlers a further period in which to record their applications, this measure being termed "An Act to amend the Settlers' Rights Act, 1904." One of the objections taken by the Federal Administration is that such legislation proposes to authorize the alienation of rights which were conveyed by the Province to the Dominion and by the Dominion conveyed to the E. & N. Ry. Company in consideration of the latter constructing a railway on the Island. Among other points advanced by the Provincial Government in its answer is that there is no difference in principle between the Act of 1917 and that of 1904, both being identical in character, and that the Dominion is inconsistent in disallowing the one and allowing the other to stand. This legislation, and the conflict which it has caused between the Federal and Provincial Administrations, involves title to considerable of the undeveloped coal areas of the Island. This is now, for the most part, in the hands of the Canadian Collieries (D), Ltd., to which company it was transferred by the Esquimalt & Nanaimo Ry Co.

THE SMELTER RATES INQUIRY.

At the opening session of the Committee appointed to inquire into the fairness or otherwise of the treatment rates charged on custom ores by the Consolidated Mining & Smelting Co. of Canada at its Smeltery at Trail, B.C., it was explained by Mr. S. S. Fowler, the chairman, that evidence either in the nature of criticism or suggestion would be heard from anyone. Such evidence might be given orally or in writing. It had been decided that, where witnesses made the request, their testimony would be heard "en camera" and would be treated as confidential. It was explained, in this connection, that some who might wish to be heard felt that, if they went before the Committee without assurance to the contrary, details of their mining business or of the concerns for which they were employed, would become public to the prejudice of such private interests. Members of the Committee, after taking the evidence of one witness behind closed doors, decided that they would visit the Trail Smeltery and meet representatives of the management of the company in order that necessary arrangements might be made for investigation of the conditions relative to the operation of the plant. A circular is being issued by the Committee for distribution among operators and mining men throughout the Province, explaining that the inquiry has been opened, and that evidence on the question will be welcomed from all who desire a hearing or are of the opinion that they have knowledge which will throw further light on the issue. In the meantime further indications that the inquiry does not satisfy a faction of the operating miners of Eastern British Columbia is furnished by a resolution passed by the Kalso (B.C.) Board of Trade, which explains itself and reads as follows:

"That this board place itself on record as not being satisfied with the appointment of a committee with limited power and authority for investigation into the matter of smelter rates and treatment of lead and zinc ores by the Consolidated Mining & Smelting Company's plant at Trail, and that we believe only by a Royal Commission can a complete and satisfactory investigation be made, and that copies of this resolution be forwarded to the Minister of Mines and the Federal Member."

Prospecting at Trail.

"Sandy" McDonald, an old Cariboo placer miner, has interested and surprised residents of Trail, B.C., by staking Camp Welcome, Claim No. 1, on the Columbia River, just opposite the town. His work is proceeding practically in full view of the populace of the smelting centre and he is said to already have recovered both fine and coarse gold. He professes confidence that, as soon as he has the ground properly opened up, he will be able to prove its value and, incidentally, to justify his faith.

Mr. D. A. Angus, of the Wright of Way Mines has returned from a trip to southern points.

JANUARY SITTINGS OF MINING COMMISSIONER.

The January sittings of Mining Commissioner T. E. Godson, have been concluded at Haileybury.

The dispute of John I. Ritchie, George T. Hamilton, and J. W. Myles vs. John T. Green, was a question involving discovery. An examination had been made by engineers of the department, as well as by the mining inspector. After consultation the litigants agreed to relinguish the restaked properties, the former claims to be reinstated and divided according to the terms of settlement agreed to.

Decision was reserved in the case of E. H. Horne vs. R. B. Morrehead, B. Babayah and Robert Carlyle.

In the dispute of J. A. Knox vs. C. Steveson, as well as the dispute between J. A. Knox and Peter J. Graham, owing to the illness of Stevenson, a material witness, stands over to the next sittings.

In the case of Horace Patterson vs. R. A. P. Mining and Development Company, the order of the applicant is to go as asked unless the respondents show cause forthwith.

A settlement is pending in the dispute between Peria et al vs. Kell and Ufland. An enlargement was asked for to permit settlement.

In the dispute between Joseph Harvey, jr., vs. Fred Egan, judgment was reserved.

ASKING FOR BOUNTY ON IRON ORE.

Ottawa, Feb. 3.

In support of a movement to encourage the mining of iron in Canada, representatives of the Boards of Trade of Port Arthur, Sudbury, Sault Ste. Marie, North Bay, Vancouver and other cities and towns will wait on Sir Thomas White, acting Premier, and other members of the Government at 12.30 p.m., to-morrow. The delegation will be introduced by Mr. F. H. Keefer, M.P., Parliamentary Under-Secretary of State for External Affairs.

The deputation will suggest that one dollar shall be paid for every dollar's worth of iron ore produced in Canadian mines. When iron and steel bounties were paid on the tonnage of pig iron produced in Canada, members of the deputation state, the amount of Canadian ore used in smelters was comparatively small, American ore being used mainly. If the $26,000,000 so expended had been paid in the way now suggested, the deputation believes iron mining in Canada would have been much more advanced than at present.

Miners Flocking to Gold Camps.

The trek of mine workers to the gold camps of Northern Ontario has become fairly general. Accommodation is being taxed to the utmost. The leading Porcupine mine is about to construct fifty dwelling houses in the town of Timmins. Various mines, closed down for from one to three years, are planning early resumption of work, and the gold output of this country may reasonably be expected to record a big increase during the current year. Before the end of the current year it is expected eight Porcupine gold mines will be producing gold, as against four at the present time. Likewise in the Kirkland Lake field similar increases are anticipated. Two mines are now producing, whereas before the end of the current year six are expected to reach the producing stage. In the Boston Creek district very satisfactory headway is also being made.

CENTRAL ELECTRIC POWER STATIONS IN CANADA.

A Census and Directory of the Central Electric Power Stations in Canada has just been completed by the Dominion Bureau of Statistics and the Dominion Water Power Branch of the Department of the Interior working in co-operation and with the assistance of the Ontario Hydro-Electric Commission, the Quebec Streams Commission and other Provincial Departments concerned. The Report is in two parts, Part I. comprising a complete census and statistical survey, with accompanying explanatory matter, whilst Part II. forms a comprehensive directory of all commercial and publicly-owned power stations in operation throughout Canada, showing the principal features of each, the locations where blocks of electrical energy are for sale, the price at which power is obtainable, transportation facilities available in the vicinity, etc. The collection of the data was made by the Bureau of Statistics and the Provincial Departments and the analysis and preparation of the data by the Dominion Water Power Branch.

The statistics include only central electrical stations, that is, stations engaged in the sale of electrical energy; all other electrical estabishments, such as electric railways, electro-chemical and other electrically operated industries, are excluded. Outstanding features of the report are as follows:

Capital and Labor.—The capital invested in central power stations totals $356,004,168, of which 79.5 per cent is invested in commercial stations and 20.5 per cent in municipal or publicly-owned stations. These figures indicate that the capital cost of central electrical station systems in Canada per primary horse-power installed is $193, averaging $196 per horse-power for commercial stations and $183 per horse-power for municipal or publicly owned stations. This cost includes all capital invested in construction and equipment of hydraulic works, power stations, transmission and distribution systems; real estate; cash on hand; current assets; sup-

The total employees connected with the industry, including officials and wage earners, numbers 8847, of which 58 per cent are connected with commercial and 42 per cent with municipal stations. The salaries and wages paid to these employees total $7,777,715 per annum.

Revenue.—The total revenue received from the sale of electrical energy is $44,536,848, of which $29,135,399 was secured by commercial and $15,401,449, by municipal plants.

Power Installation.—The primary power installation in central stations totals 1,844,571 h.p., of which 78.3 per cent or 1,444,314 h.p. is installed in commercial stations and 21.7 per cent or 400,257 h.p. in municipal stations. Of the total primary horse-power installed, 1,652,661 h.p. is derived from water, 180,800 from stream, and 11,710 from gas and oil.

The total primary power installed in central electric stations throughout the Dominion averages 221 h.p. per thousand population. Yukon averages the highest with 1,206 h.p. per thousand population, British Columbia coming next with 378 per thousand population, Ontario with 286 per thousand population, Quebec 271 per thousand population, Manitoba 118 per thousand population, New Brunswick 49 per thousand population, Saskatchewan 47 per thousand population, Nova Scotia 34 per thousand population and Prince Edward Island 13 per thousand population. Population by provinces is the only feasible basis available for making a per capita

analysis of the central station industry. The occupation of the population, and its varied density in different localities have a direct bearing on the market for electrical power, and consideration of these phases will assist in explaining the above variations in the per capita development.

Cost of Construction.—Of special interest is the actual cost of construction of hydro-electric power stations per installed horse-power. Omitting all real estate, transmission and distribution equipment, seventy representative hydro-electric stations throughout the Dominion, with an aggregate turbine installation of 745,797 h.p. and a total construction cost of $50,740,458 show an average cost of $69.11 per installed turbine horsepower. The figure in brief represents the average capital cost of construction at the power site and is of considerable interest to engineers.

Hydro-Electric Power in the Central Station Industry.—One of the most important facts disclosed as a result of the statistics is the outsanding position which water power takes in the central station field. Out of a total installed primary capacity of 1,844,571 h.p., 1,652,661, h.p., or 89.6 per cent—practically 90 per cent—is derived from water. This figure is indicative of the extent and availability of the water power resources of the Dominion and of the remarkable degree to which their adaptability for central electric station work has been appreciated in principle and realized in practice. The vast water power resources of the Dominion, the ready adaptability of hydro-power to the production of electrical energy and the increasing extent and scope of economical electrical transmission form an industrial asset which probably more than any other will ensure a full measure of future prosperity.

The Yukon develops 97.4 per cent of its primary central energy from water. Ontario develops 95.7 per cent from water indicating markedly the commercial adaptability of water power for central station work, even where in competition with convenient and reasonably cheap coal supplies. Manitoba develops 95.2 per cent of its central station energy from water, Quebec 94.9 and British Columbia 89.9 per cent. Alberta develops 43.2 per cent from water, although an abundant supply of coal is available. New Brunswick develops 38.8 per cent from water power, Nova Scotia 19.2 per cent. The percentage of water power used in central electric stations in Nova Scotia is low although the province is exceptionally endowed with available water power resources. An abundant coal supply indicates the reason for this condition. The city of Calgary is served from a steam-driven plant, the largest central electric station in the Province. The present tendency in the province is, however, towards the increased use of hydro power. In Prince Edward Island only 13.9 per cent of the central station power is derived from water. Topography and area of the Island province explains the lack of water power resources. In Saskatchewan no water power is developed. Here the topography of the province is solely responsible, the entire settled portion being located in prairie country which is not naturally endowed with attractive water power sites.

Tables 1, 2 and 3 provide a more detailed analysis of the statistical data referred to in the foregoing.

Directory of Central Stations.—The directory of central electric stations in Canada, whilch forms Part II. of the Report constitutes a ready reference to the central electric stations of the Dominion. Garvke's Annual issued in England and McGraw's Directory published in the United States have attempted to deal with this field in Canada, in order to provide reference data in the general interests of commerce and industry. The material which has now been compiled is much more exhaustive and comprehensive in every way than either of these publications, and it is thought that it will prove a valuable asset in the reconstruction period as it permits a bird's eye view of the present status of the industry in all parts of the Dominion and indicates the locations where expansion is readily feasible. As already stated, a special effort has been made to secure from the various corporations and municipalities, information relative to blocks of electric power available for sale; the prices at which such power can be provided; the available sites for industry in the vicinity, and the transportation facilities available. The corporations and municipalities have co-operated heartily in this connection. It is intended that, in so far as possible, this information shall be kept up to date, in the Dominion Water Power Branch.

For Part I (statistical) application should be made to the Dominion Bureau of Statistics, while for the Directory, Part II., distribution will be made by the Dominion Water Power Branch.

Time Clocks in Schools

Proposal that School Pupils and Students Register Their Time, Arouses Wide-Spread Attention —Employers are also Keenly Interested in the Movement.

Educators all over the country are discussing the proposal of Principal F. P. Gavin, of the Windsor, Ont., Collegiate Institute, that students be required to register IN and register OUT on time recorders, just as they will later do in the business world.

Principal F. P. Garvin is to be highly complimented on this advanced idea, showing that he realized that the future business people of the country cannot be taught the value of time and the value of punctuality too early in life.

People prominent in various walks of life have gone on record to the effect that Principal Gavin's idea marks a new era in school life. What greater lesson, they ask, can a child or young person be taught, than the value of time and punctuality, and at the same time be taught one of the greatest essentials to success in business? While School Boards in some sections are already using Time Recorders in connection with the Teachers, Principal Gavin's proposal quite indicates that he is of the opinion that its disciplinary benefits should go further and include the pupils also.

Incentive Supplied Students.

In addition to affording both teachers and parents an indisputable record of the time that each pupil arrives at the class room, or leaves the class room, it is pointed out that a direct incentive is supplied the student, for the reason that the method would eliminate the bad habits of arriving late or leaving early on some trivial and often doubtful excuse, frequently offered under the supposed parental authority. This, teachers argue, would be a great benefit in carrying out the class schedules, and improving the morale of the class.

Moreover, the valuable study time lost by each pupil must, when one considers the hundreds of thousands of pupils, amount to many hundreds of thousands of hours monthly. Moreover, such lost time must set a bad example to all pupils as is evidenced by the present indifference on the part of many pupils to this question of punctuality. These two factors are said to be the greatest evils in the present educational system, and is one of the reasons why the teachers have been found to be genuinely interested in the new movement, to record all the comings and goings of their pupils.

Eliminated Favoritism.

Teachers are recognized as being very human people. In fact, it is necessary that they be so, and this fact in itself makes it difficult indeed for a teacher to eliminate what might be called favoritism. Parents see in the new idea a method that will remedy this element. The time recorder of course is totally impartial, and since each pupil would register his or her record, it follows that the personal element cannot enter into it. This must be important in the childrens' minds, for they would quickly recognize that each and all were treated exactly alike, which is recognized as the one method to command the greatest respect.

Parents would unquestionably place high value on the time card record that the pupil could bring home at the end of each week or month. They would know immediately whether their children were loitering on the way to school or on their way home, and further, know almost to the minute how long a child had been kept in at school, all of which is valuable information.

Employers Keenly Interested.

In view of the far-reaching effects in later life this proposition is likely to have, business men and particularly manufacturers, are watching the progress of the new movement with undisguised pleasure. They see in it the best remedy for the old commercial and industrial evil, the "late" habit of new employees recently out of school.

It is a well-known fact to all employers that this tardiness with its direct loss to the firm, is mainly due to the fact that all through school life the pupils or students were not educated along the lines of making a printed record of their comings and goings. Manufacturers feel that the time recorder should have its place in school life, it is the training ground for business, since it has been found indispensible in the later. The general concensus of opinion of the business men interviewed on the subject is unquestionably in favor of the installation of time recording machines, in every school and educational institution in the country. They point out that many young men or women have lost an opportunity of promotion by their executives owing to the fact that they had not exhibited the proper appreciation of the value of time or the value of punctuality.

Major R. W. Coulthard, who recently returned from France, is now in Toronto, where he recently took charge of the Davisville limb factory of the Department of Solviers Civil Re-establishment.

Mr. O. A. Dunlap has been elected vice-president of Hollinger Consolidated Mines, succeeding the late John McMartin.

Want Bounty on Iron

Mining men and citizens generally of the Canadian West propose once more to bombard the Dominion Government in the effort to secure the passage of legislation placing a bounty of 50 cents a ton on the production of pig iron in Canada. Some action of a similar character was urged by a strong delegation from British Columbia at the Canadian Capital last year with no more effect than the elicitation of a promise that the Federal Government would purchase all pig iron produced for which no other market was available at "the market price." This had no effect on the industry, and none was looked for by the disappointed delegates. Apart from other considerations the phrase "the market price" was too indefinite. Did it mean "the market price" in the West or the East of Canada. If the latter, then there was no advantage, and further representations failed to secure any clearer explanation of what was meant. Now mining men of northern Ontario are joining with the Pacific Province in the movement, as is evinced by the following telegram received by Hon. Wm. Sloan, Minister of Mines for British Columbia:

Port Arthur, Ont.,
January 2t8h, 1919.

Wm. Sloan,
Minister of Mines,
Victoria, B.C.

Delegation meets at Ottawa February 3rd on iron bounty and increased production of iron and steel in Canada. We urge you to attend. If impossible, send representative or wire your endorsation of movement to your own member or to F. H. Keefer, M.P., Ottawa.

E. J. BLAQUIR,
MAYOR A. W. ROBERTS,
President Board of Trade.

The whole-hearted co-operation which Port Arthur may look for from British Columbia in regard to this matter is indicated by Hon. Mr. Sloan's reply, which follows:—

January 29th, 1919.

E. J. Blauquier,
Mayor A. W. Roberts,
Board of Trade,
Port Arthur, Ont.

Re your wire and importance of Dominion Government adopting such policy as will encourage development of Western Canada Mineral Resources and production of Iron and Steel, wish to state that representations of this character have my hearty sympathy, and that I sincerely trust your efforts will meet with success. Regret am unable, owing to opening of Provincial Legislature to-day, to join your delegation in person. However, have taken this matter up with Dr. S. F. Tolmie, M.P., and Charles A. McIntosh, M.P., who assure me that there is no doubt the British Columbia representation at Ottawa is a unit on this question, and will as a body press the claims of the West during the forthcoming session of Parliament. In this connection may say that it is my present intention, as soon as local sessional duties permit, to visit Ottawa to add my support to the end that the Federal Government take steps to encourage this important industry. We feel that our Government, in offering bounty of $3 a ton on pig iron produced in

the Province from local ores, has gone as far as our financial resources permit, and the Dominion Administration should give practical evidence of its interest in the development of the immense iron deposits of the West which now are dormant. We are on the threshold of a period of reconstruction and it is of the utmost importanct to the indusrial and commercial fuure of our country that this vital basic industry should be established.

WM. SLOAN,
Minister of Mines.

OBITUARY.

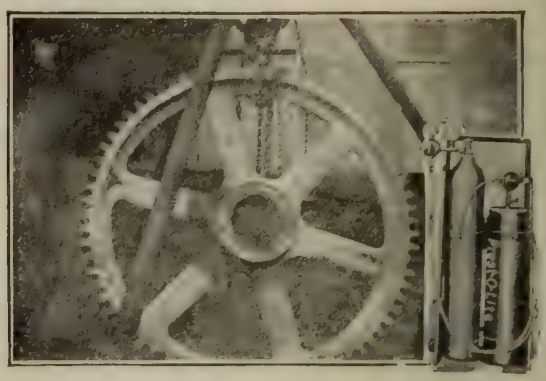
James Cumming.

One of the pioneer mining men of the Canadian West died at Vancouver, B.C., on December 3rd last, in the person of James Cumming. He was known to all old timers, having figured prominently in the events connected with the rush to the Cariboo gold fields, where he went in 1862 and where he worked for eight years, having been identified with the development of the famous Cameron claim. Until a few years ago he lived in the same district, operating various placer claims with indifferent success, but always cheerful and buoyed up with the never-failing confidence that some day he would make the "big strike." In 1912 Sir Richard McBride presented him with a Free Miner's License as a public and personal testimonial.

Will Abolish "Closed Towns."

Legislation is proposed by the Hon. T. D. Pattullo, Minister of Lands for the Province of British Columbia, which will affect the policy of the Granby Consolidated Mining & Smelting Co., Ltd., as well as other mining and manufacturing companies, of maintaining what are termed "closed towns" in those areas near their plants where homes are provided for officials and employees. The companies' explanation for their course in this report is that it is in the interest of their respective businesses that agitators and idlers, and people generally with no particular business, shall be kept out of such centres. On the other hand the Minister of Lands takes the position that the right of any private corporation to arbitrarily prohibit intercourse between the members of their particular community with the outside world is questionable, that it results in the restrain of free competitive trade, and is an unjustifiable interference with the freedom of the subject. It is not proposed by the Government, however, to place any law on the statutes which will force the companies to throw open their towns to the same extent as are the usual run of municipal corporations. The Lieutenant-Governor-in-Council will be given power to declare certain communities company towns, within the limits of which the public shall have free right of ingress and egress over the ways and roads used by the companies as avenues of traffic; but it is not intended that the ways immediately adjacent to the works themselves and used solely in connection with actual industrial operations shall be deemed avenues of traffic. In other words the prohibition will be lifted as regards avenues of traffic which are in the townsite proper and on which are located the various public offices, public buildings, etc. Provision also will be made for wharf accommodation for public traffic and use in cases of those towns where water transportation is the only means of approach.

Oxy-Acetylene Welding and Cutting



This Expensive Gear Wheel Reclaimed at Trifling Cost

This Gear Wheel, in a large plant at St. Catharines, was broken recently. To replace, it would have taken much valuable time and represented quite a serious expense.

A local Prest-O-Lite operator was called in and undertook to repair the casting in record time at trifling cost.

The work was done by the job welding department of the International Garage, St. Catharines, Ont., and has given complete satisfaction.

Prest-O-Lite Oxy-Acetylene Welding is proving a great economic factor in the Factories, Mills, Railroads, Mines and Machine Shops of Canada.

Prest-O-Lite PROCESS

employs both gases (acetylene and oxygen) in portable cylinders. Prest-O-Lite Dissolved Acetylene is backed by Prest-O-Lite Service, which insures prompt exchange of full cylinders for empty ones; provides dry, purified gas, insuring better welds, quicker work and lower operating cost.

Apparatus consists of an equal pressure blow pipe, automatic regulators and gauges, and all necessary equipment. Adaptable for oxy-acetylene cutting by the addition of special cutting blow pipe.

Thorough instructions are furnished free to every user of Prest-O-Lite Dissolved Acetylene. Any average workman who understands metals can learn the welding process quickly and easily.

We will gladly send illustrated literature and interesting data showing actual instances of savings made by others. It may suggest valuable ideas to you. Write for it.

Address Department C-108.

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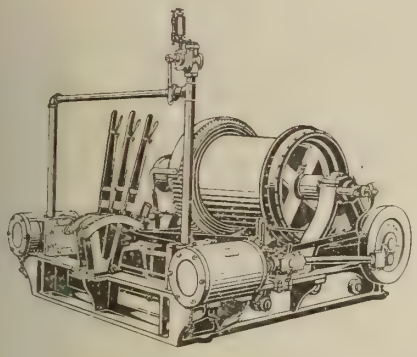
World's Largest Makers of Dissolved Acetylene

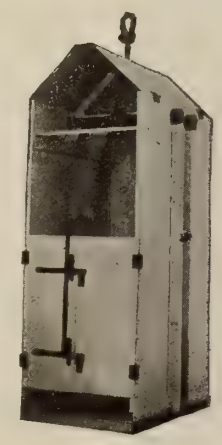
MINE HOISTS AND CAGES



With our Hoists and Cages your men are at all times perfectly safe.

The Hoists are made to your order exactly the way you want them made.

The cages are also made to order to fit your shaft, and are provided with a proper Safety Device so the cage cannot fall to the bottom of the shaft if the cable breaks.



We make these Mine Hoists reversible or non-reversible, and with Friction Drum, as shown, or with Drum Keyed fast to the shaft. We also make them for either Steam, Electric, or Belt Driver, and in 7 sizes, from 10 to 50 H.P., and with any required size of Drum up to 48''.

Marsh Engineering Works Limited, Belleville, Ontario

ESTABLISHED 1846

Sales Agents: MUSSENS LIMITED, Montreal, Winnipeg and Van ouver

Northwest Kootenay Mining Association.

The mining companies of the Golden and Windermere districts of British Columbia are organizing the Northwest Kootenay Mining Association, the object of which will be to encourage mining in that section and to assist in any way that may suggest itself in the advancement of the industry.

CUT GEARS

All Types - Any Size
Large Capacity

Hamilton Gear & Machine Co.
Van Horne St. - TORONTO

FOR SALE—TWO CLAIMS

Adjoining Hattie Gold Mines in Coulson, Beatty Area
Would give Working Option to responsible parties

H. C. CROW, 184 Sunnyside Ave., TORONTO

BURNS & ROBERTS

MANUFACTURERS OF STEEL PLATE WORK
Tanks, Air Receivers, Penstocks, Etc.
Dealers in Railway and Power Plant Machinery
BANK OF HAMILTON BDG., TORONTO LIMITED

FOR SALE

1 4x8 Marathon Mill, with 7 tons of grinding rods from 5/8 to 1¼ in. diameter, and 7 tons extra 1¼ in. rods. The delivery of this mill was too late for the purpose for which it was bought, so it has not been used.

1 12-in. x 15-in. two-drum Jenckes Tandem Hoist, with one 20-in. auxiliary drum and one nigger-head mounted on the shaft extension. Second-hand, but in good condition.

1 Steel Mast, 11 x 17 inches, 45 or 60 feet long, equipped with all sheaves, foot castings and swivel top piece for 12 guy wires.

1 1 cu. yard Mansfield back dump Excavator Bucket, second hand.

McKinley-Darragh-Savage Mines Limited

COBALT, :: ONTARIO

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DID YOU EVER WISH FOR DAYLIGHT AT NIGHT?

Those new buildings that have to be rushed to prepare for extensions—the new equipment to meet that increased tonnage — the emergency that means night work at the shaft opening — the loading of supplies and timber for underground at night; these are but a few cases where

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will produce big returns in time and money saving for a comparatively small investment. The light can be diffused over large areas or projected in a solid beam—there are no carbons to trim—and the lamp is perfectly portable — no permanent wiring necessary.

Write for descriptive folder "Electric Daylight," giving prices and full information. Tell us your night-lighting problems.

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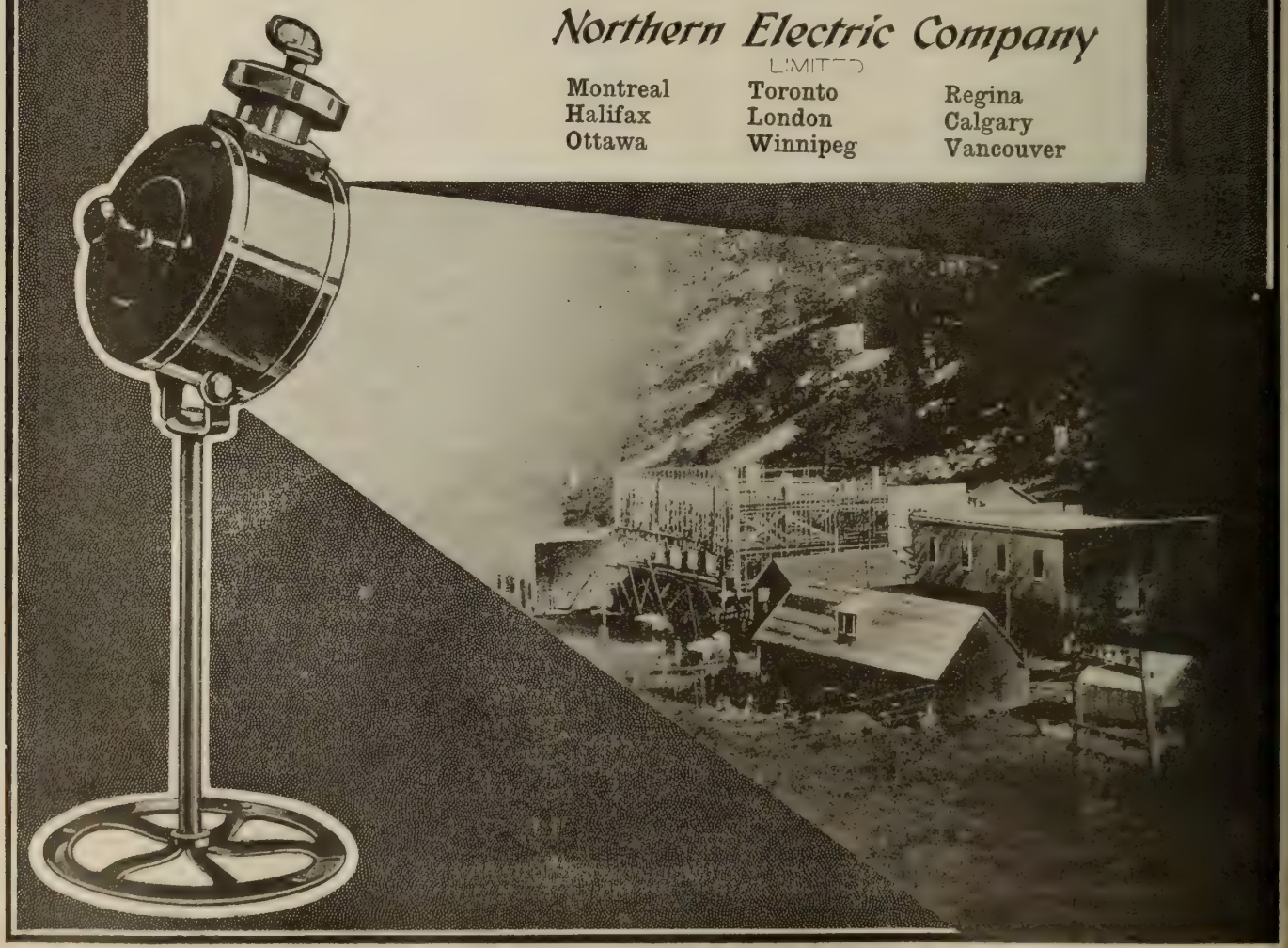

:-: EDITORIAL :-:

AN OPPORTUNITY FOR THE CANADIAN MINING INSTITUTE TO SERVE THE INDUSTRY.

Great interest is taken in the election for president of the Canadian Mining Institute this year, owing to the feeling that it is desirable that the Institute should play a more important role in the mining industry. In the opinion of many members, an Institute that would exclude others than engineers would be of comparatively little use to the industry. It is true that it would be much better to have such a society than none, and that much good results from purely technical discussion among engineers. It is true also that there would be some advantage to engineers in membership in an exclusively engineering society. Our contention is that the Canadian Mining Institute has a bigger field for usefulness. It has an important place to fill as representative of the mining and metallurgical industries. It should further the interests of its members, not by seeking special privileges for them, but by speeding up the development of our mineral resources, and by guiding development along lines that are in the national interest.

If the Mining Institute is to represent the industry, the members must see to it that the officers of the Institute are active in educating public opinion in regard to mines and mining. There is little use in complaining of the lack of consideration which Governments give the industry, so long as no great effort is made to inform the people who elect the members of parliament. Governments can afford to ignore the mining industry only so long as there is no general appreciation of the advantages that the country reaps from the activity of mining and metallurgical companies. If the Canadian Mining Institute will perform its natural function as the mouthpiece of the industry, the public will be so well informed that Governments that do not feel disposed to take a leading part in the development of our natural resources, will find it advisable to consider whether mining is not an essential industry in this country.

Mining is, next to agriculture, our greatest basic industry; but the people do not yet realize it, and consequently those who represent the people have given the industry little consideration. Few members of parliament show any indication of having more than a child's knowledge of mines, minerals, and metallurgical works, and their importance to Canadians.

Who is to blame for this condition of affairs? If this country were run on the German plan, we might justly lay the whole blame on the governments. We are not sure that Canada is entirely free from Kaiserism; but so far as leadership in developing mineral resources of Canada is concerned, our Federal Governments can well plead not guilty. If we accept the idea that our system of government is a purely democratic one, our Federal Government has good reason for ignoring the mining industry. If the electors do not press for more activity on the part of the Government in developing our mineral resources, the inaction can be expected to continue. Some organization must undertake to inform the electors. The natural organization is the Canadian Mining Institute.

We believe that the most important work for the Canadian Mining Institute during the period of reconstruction is to do what it can to speed up development. Our mineral deposits do not increase with age. Every year we leave the deposits undiscovered and undeveloped, we are denying ourselves the use of our natural walth. If the public appreciated this, would they not insist on every encouragement being given to mining? Cannot the Canadian Mining Institute do much towards improving the status of mining in Canada, by functioning as the voice of the industry?

What the Mining Institute does during the coming year towards increasing the faith of Canadians in our natural resources and in obtaining greater aid from governments for the mining industry, depends largely on whom the members elect as president. Members at Porcupine and Toronto have nominated Mr. J. B. Tyrrell for this office, because they feel confident that he will devote much of his time to the affairs of the Institute, and because he is an advocate of greater publicity for mining, recognizing as he does that one of the most important duties of the Canadian Mining Institute is to inform the electors and the governments on matters of importance to the mining industry. Moreover, Mr. Tyrrell's work takes him to all parts of Canada, and if he is elected we may expect him to take an interest in mining and metallurgical work in every district.

Those who are supporting Mr. D. H. McDougall for the presidency say:

"Mr. McDougall, a native of Nova Scotia, is President of The Nova Scotia Steel and Coal Co., and has

been actively engaged in the coal, iron and steel industries throughout his professional career. Mr. McDougall has already rendered exceptionally valuable service to the Institute. As President of the Mining Society of Nova Scotia he aided essentially in effecting the amalgamation of this Society with The Canadian Mining Institute during the past year. This is a step which has long been desired, and which materially strengthens the position of the Institute as a national society. Moreover, during the last year, Mr. McDougall took a very active interest and did a large share of the work in the organization of the Iron and Steel Section of The Institute. It is our confident belief that Mr. McDougall's election as President this year is especially desirable not only on general grounds, but also in order to bring both of these measures, to which he has already so largely contributed, into full working effect."

Mr. McDougall is admirably fitted for the office of President of the Canadian Mining Institute. We have no doubt that, he would be able to do much along the lines indicated by those who have endorsed him for election this year. We hope that he will fill the office at some time in the near future: but for the most important work which the Institute could do this year, Mr. Tyrrell appeals to us as the logical president. Mr. Tyrrell is one of those who believe that the Institute should endeavor to be of greater service to the industry, by taking a more active interest in all matters affecting the industry. We know that he can and will give the necessary time and attention to such work. The Institute needs such a president. We admire Mr. McDougall, but we hope that Mr. Tyrrell will be elected.

PROTECTION OF INVESTORS.

It is almost certain that this year is to be marked by great increase in activity in mining and exploration in Canada, particularly in the gold producing areas. Gold mining was unattractive during the period of high prices, but much progress was made by the companies that were able to continue operations. There is every reason to be optimistic for the future. We may expect that many investors will be attracted by the promise of wealth to be gained, and we expect that development of our mineral resources will justify large expenditure. We hope that a larger number of Canadians will take part in this development and share in the profits.

We would warn those who are inexperienced in mining, however, that the development of mineral resources is in the early stages a very uncertain business. In the case of mines that have been well developed and have been producing for some time, there are good grounds for predicting the results of operations for some years ahead. In the case of new properties on which little work has been done, those who provide funds for development take long chances. They should see to it that they have an opportunity to make correspondingly large profits in case the venture proves a successful one. Those who invest in mining securities should realize that while there are many profitable mines, there are comparatively few like Creighton, Hollinger and Nipissing. The chance of any prospect developing into such mines as these is very, very small. Those who are most familiar with the mining industry consider such properties to be as good security as any industrial enterprise, and better than most. They also consider, however, that such prizes are rare, and that while others such as these will be developed it will only be after many unprofitable properties have been tested.

Development of new properties usually necessitates considerable expenditure before any return is possible. Those who subscribe money to pay the cost of development should see to it that their money is used for development, and that if the venture is successful they obtain profits comparable with the risk they take. Governments can provide some protection for investors by insisting on full publicity of company affairs, so that the investor may be able to judge, whether his money has to earn an unreasonable amount for others before it will be possible to return large profits to the subscribers. But it is scarcely possible for Governments to make such inquiry into every company's affairs as to remove all risks for the investor. The experienced investor finds it advisable to consult reports of expert examinations of properties and to satisfy himself as to the character of the promoters. There are risks enough in developing new properties when the money invested is used in well advised development work.

It is particularly desirable at this time that development be speeded up and that Canadians take a larger part in the development. We hope that those who wish to obtain the co-operation of the public will see to it that the public is given a fair show. Investment in most mining enterprises is properly classed as speculative and investment in undeveloped properties is very speculative. Those who cannot afford to risk losing their money should not be invited to take part in such enterprises. On the other hand those who are able to risk something in the hope of making large profits should be encouraged to do so. They should be given all the known facts and not asked to believe that they are investing in enterprises that are sure to be successful. Unduly optimistic statements may attract some investors, but such men are not likely to put their money into a second enterprise of the same sort. If we would foster Canadian investments in mining enterprises, we must see to it that everything possible is done to in

form the public of the risks as well as of the possible gains. There are many who would be willing to risk their money if they were confident that they were given reliable information by promoters. Those who launch new companies would do well to bear in mind that they scare away experienced investors when they describe prospects as mines and when they endeavor to hide vital matters by glowing phrases. There will be more publicly subscribed money for mining when there is more plain talking by promoters.

It is customary to suggest as a remedy for all evils, that the Government do something. In this connection many will claim that the Government should be asked to make a searching inquiry into every new mining and exploration company, and have experts report on the actual value of the shares offered for sale. We believe that the Government might do good by insisting on more explicit statements by promoters; but we do not believe that Governments should be asked, or that they could if they tried, at reasonable expense, obtain all the desired information. It is in the search for information that much money must be spent in exploration and development. Those who find, by an expenditure of money and labor, that a prospect gives promise of becoming a profitable mine, are the ones who should be rewarded for the risks they have taken. Governments cannot give such information. They can, however, help to obtain the desired information and they can well be asked to do more work of the character they are now doing. They can help the prospector by geological maps and reports, by transportation facilities, and by suitable mining laws and regulations, and they can help protect investors by taking a more active interest in the flotation of new companies, and in new offerings by old ones.

A MISLEADING PROSPECTUS.

There has lately been on exhibition in shop windows in Yonge street, Toronto, specimens of silver ore and rocks from the Cobalt district, which serve to draw attention to a company that is soliciting subscriptions to develop a prospect known as the O'Connor property, Coleman township. Concerning this property the salesman interviewed by the writer made some strange statements. We were also presented with a copy of a prospectus, dated December 17th, 1918, and "filed in the Office of the Provincial Secretary of Ontario."

According to this prospectus the property "is located in a rich, proven mining district." An 'engineer' says of the ore deposit that "the vein filling is calcite, cobalt, nickelite, and smaltite." * * * * * "at 6 ft. depth, the vein jumps" * * * * * "the vein is well defined and is one of the strongest fissure veins in the Cobalt Camp."

Now the property is not in the Cobalt Camp and the vein would have to make many 'jumps' to get there. Those who read the prospectus may, however, be satisfied with the statement that the 'engineer' who reports on the property has been informed "on good authority" that another person "took a general sample of the ore from a 58 ft. level and got 520 oz. silver." The 'engineer' fails to state how much ore was taken, but we imagine that the sample weighed at least one ton. It would be of interest to learn how the sample was taken and what its significance is.

We do not doubt that silver has been found on the property and that as a prospect it is worth some attention; but what we learn of the ore deposit from the prospectus it does not impress us very favorably.

Even worse than the description of the ore deposit is the information, or lack of information, concerning what the purchaser of shares gets for his money.

OUR PLATINUM AND PALLADIUM PRODUCTION.

In an article published in the "Toronto World" on Thursday, February 6, Mr. J. F. Black, of Sudbury, calls attention to the production of precious metals. He quite properly emphasizes the fact that proper record is not kept of the precious metals contained in the ores mined in the Sudbury district. The statements published abroad concerning our output of platinum and palladium are very inaccurate, doubtless because of our own failure to publish accurate statistics.

In a graphic representation of the metals output of the British Empire, published recently by a supposedly good authority in England, Canada's output of palladium and platinum is given as a few ounces per year. Actually the annual production is valued at several million dollars.

Very large quantities of these precious metals are mined with the nickel and copper of the Sudbury district. Our Government records do not show what the amount is. Are Canadians so uninterested in their own natural resources that they will not undertake the task of keeping a proper record of production? It would cost something to obtain the exact figures by sampling every shipment, but with the co-operation of the producers a close approximation could be made without great difficulty. From what we can learn, a good deal of the precious metals is lost in the process of treating the matte. As most of the refining is done in the United States and Wales, we have no record of the recovery. Canadians should be advised, however, concerning the amount of precious metals contained in the mine, smelter, and refinery products exported.

Reports of British Columbia Government Mining Engineers

A feature of the Preliminary Review and Estimate of the Mineral Production of British Columbia for 1918, which has just been issued by the department presided over by the Hon. Wm. Sloan, Minister of Mines, are the summaries by the six mining engineers, appointed to the same number of Provincial districts to report upon and to encourage mining development therein, of the work coming within their respective jurisdictions during the past year.

Mr. G. H. Clothier, of the Northwestern District, draws attention to the increase in the production of copper and gold in that section of the Province. He points out that the exceptional showing in respect of the former metal is due to the Granby Consolidated Mining & Smelting Co's operations, while the good showing as to gold lies to the credit of the Belmont-Surf Inlet Mines, the production of which, it may be said parenthetically, is one of the notable occurrences of the year 1918 in this Province from the standpoint of the mining industry. It is pointed out, however, that the placer fields of his district have not yielded as before because of the oft-quoted fact that the value of gold stands still while the cost of everything connected with its production has been soaring.

The output of the Northeastern District is placed at about $375,000 in value by Mr. J. D. Galloway, Government Mining Engineer. Nothing of special interest is noted by Mr. R. W. Thomson, of the Central Mineral Survey District, although he furnishes particulars of the development of various mining properties which indicate that mining is far from stagnant in that section. Mr. P. B. Freeland, of the Southern Mineral Survey District, states that some 705,000 tons of mixed ore were produced within that district during 1918 and that "considerable activity was shown during the greater part of the year in prospecting for minerals necessary for war purposes." Of this work and its results he promises more details in the annual report. The various mining enterprises of the Kootenays are dealt with in some detail by Mr. A. G. Langley, of the Eastern Mineral Survey District, while Mr. Wm. M. Brewer, of the Western District, which includes Vancouver Island and a part of the lower British Columbia Mainland, observes that, while there has been no phenomenal progress in either coal or metalliferous mining in his district, the advance has been steady.

In introducing his report Mr. Clothier says:

"The output of the district for the year will approximate 837,200 tons, producing 30,908,300 lb. of copper, $980,000 in gold, and $282,000 in silver. This is a considerable increase over last year, due to the greater production of the Granby Consolidated of copper, while the increase in gold and silver is accounted for by the very successful year of the Belmont-Surf Inlet Mines, Limited. The output of placer gold will, however, be considerably less than last year.

"The outlook of this district for the coming year is exceptionally good, for it is almost a certainty that the railroad of the Dolly Varden will be adjusted and it will become an important producer. There is every prospect of several smaller properties in that section also shipping during the coming summer. The Portland Canal section will have a shipper in the "Bush" property this winter, with several other properties showing up well with development. These sections will greatly increase the gold-silver production of this district. The Engineer mines, at Atlin, may also be expected to become a big gold-producer, possibly within the next year.

"With the war over and the return of many of the men who enlisted from this north country, together with others who will be well fitted for the life and alive to the many opportunities of this particular portion of the Province, I look for an extensive revival of prospecting and mining activities."

Under Queen Charlotte Mining Division, he says:

"Some little local excitement was caused at a logging camp on Shuttle island, about six miles south of Lockeport, when the cook discovered gold in the gravel on the beach, and later in small quartz stringers running through the slaty country-rock. No work to amount to anything had been done on the quartz stringers at the time of my visit, but I am informed that the owner is now sinking a shaft on the most likely looking portion. The placer claims on the beach have been purchased from the original stakers and will be worked this winter. The beach gold is, without doubt, the result of the disintegration of the quartz gold-bearing stringers whose gold has been concentrated in the gravel."

Belmont-Surf Inlet and Drum Lummon Copper.

Interesting observations with reference to the Belmont-Surf Inlet Mines, Ltd., the Drum Lummon Copper Mines, Ltd., and the operations of the Granby Consolidated on the Ecstall River are found under "Skeena River Mining Division" as follows:

"The Belmont-Surf Inlet Mines, Limited, operating at Surf Inlet, on Princess Royal island, has been under continuous operation and had a very successful year. The output was 8,209 tons of concentrates, shipped to Tacoma, and yielding 43,328 oz. gold, 27,990 oz. silver, and 451,820 lb. copper, a very satisfactory showing for the first year's operation. Extensive development-work is being carried on continuously, with such successful results that the ore reserves have been largely increased. An ice-breaker has been put on the lake for the winter months, so that there will be no interruption of shipments.

"The Drum Lummon Copper Mines, Limited, has been operating its property on Douglas channel all summer. The main work underground has been the continuation of the drive on the ore-zone, which has now been opened up for a distance of over 200 feet. Considerable ore was broken down on to the drift-level before closing down the underground work for the season. This will give ample material for the mill to experiment with from now until spring. A new compressor, run by a 25-horse-power gas-engine, was installed early in the year and proved ample for all requirements. A small milling plant was erected and had been in operation only one day at the time of my examination. It is equipped with a small jaw-crusher at the head which takes the mine-run of

ore, crushing to about 1 inch size and discharging into storage-bin. Two Gibson type mills, each of 18 tons per 24 hours capacity, are fed from this bin and grind to discharge through a 40-mesh screen, feeding directly to a concentrating-table designed by the manufacturers of the Gibson mill. The whole is run by a 10-horse-power gas-engine. This plant has demonstrated that it will make a concentrate of 62.5 per cent copper, 1.12 oz. gold, 30 oz. silver, running on a feed of 5.9 per cent copper ore. The loss, however, will be very heavy unless some scheme, such as a flotation-cell, is used to treat the slimes and middling product. It is a very creditable little plant and will no doubt be gradually improved and enlarged.

"The claims up the Ecstall river, mentioned in last year's report, have been further explored by diamond-drilling by the Granby Consolidated, who have the property under option. No information is available from the company as to the results obtained. The work was closed for the winter, but will be resumed in the spring. The importance of the success of this property to this part of the Coast cannot be overestimated."

Concentrating Granby's Hidden Creek Ores by Flotation.

Coming to the Nass River Mining Division Mr. Clothier discusses the work of the Granby Consolidated as follows:

"The Granby Consolidated Mining, Smelting, and Power Company, Limited, has exceeded its last year's output of copper, smelted from its own British Columbia ores, by nearly 3,000,000 lb. The amount of ore smelted from its Hidden Creek mines was 828,488 tons, exclusive of limestone and quartz used for fluxing purposes, producing 30,394,109 lb. copper and approximately $107,000 in gold and $282,000 in silver.

"The 100-ton 'pilot mill' has been operating steadily all year in experimental work on the concentration of the Hidden Creek ores, as well as ores from the company's Alaska properties. The milling process is confined to flotation alone, and some very satisfactory results have been obtained on the siliceous ores. Good progress has also been made in experiments on the selective flotation of the heavy sulphide ores.

"The company has under way an immense project in the installation of coke-ovens, with all the attendant modern equipment for saving and utilizing the by-products. The plant will cost approximately $2,000,000, and it is expected it will be in operation early in the spring. The coal-supply for this plant will be obtained from the company's coal property on Vancouver island. The most important prospecting-work the company has undertaken during the year is the exploration of the Ecstall River pyrite-showings. I understand that results from work to date have been sufficiently encouraging to justify further investigation in the spring."

Among other notable prospects dealt with in the Alice Arm Section an interesting reference, as appended, is made to the Standard Group:

"The Standard group of four claims is situated on the south side of McGrath mountain. It is owned by W. McLean and others, of Alice Arm. The showing on the property is an immense vein of quartz, 60 feet wide where exposed by an open-cut along the side-hill, mineralized with zinc-blende disseminated through the quartz in bunches and in bands up to 2 feet in thickness; in fact, it would be hard to break off a piece of quartz that did not show zinc in the whole 60 feet. Further strippings and open-cuts down the hill expose the same class of ore, but whether it is the same vein or a parallel one is hard to decide from the amount of work done. It is a remarkable showing of zinc sulphide, about four miles from the beach, and ideally located for economical tunnel-mining. The ore, being a straight zinc sulphide and quartz, is a perfect one for concentration."

The country adjacent to the Kitsault River is found very promising. Mr. Clothier says:

"This section was in a fair way to become an important factor in the mining industry of the Province this winter or early next year. The railroad from the beach to the Dolly Varden, partially constructed last year, was practically rebuilt and nearing completion when the contracting company went into liquidation, with the result that the camp of Alice arm and the section tributary to it are tied up for the winter. It is to be hoped that an early adjustment of railroad affairs will be arranged, so that this may have the opportunity of becoming one of the most important mining sections of the Province.

"The Dolly Varden Mines Company owns the Dolly Varden property, about eighteen miles from tide-water on the west bank of the Kitsault river, and the Wolf property, two miles farther up on the east bank of the Kitsault. The Dolly Varden has been extensively opened up by underground development, as described in the Minister of Mines' Report of 1916, and is therefore in condition to start shipping at any time. The ore-bodies have been proven by thousands of feet of diamond-drilling. On the Wolf a tunnel 35 feet long has been driven in on the ore-body, from the face of which a crosscut to the north 50 feet and to the south 10 feet proves the ore-body for a width of 60 feet, with neither wall in sight. Several thousand feet of diamond-drilling has been done, proving the extent of the ore-body and showing it to be of a good milling grade."

High Grade on Big Missouri.

Of the Big Missouri in the Salmon River District, of which considerable has been heard of late, the Resident Engineer states:

"The Big Missouri group, a well-known property belonging to Lindeborg Bros., of Stewart, has undergone during the past season a complete change. Heretofore it has been considered from the standpoint of a big, low-grade-complex-ore proposition, with many difficulties in sight and requiring large capital. Work done during the past season, however, on the two claims adjoining the Mineral Hill group has proven that the same high-grade ore-shoots extend on to the Missouri ground. Fifteen open-cuts were dug all over these claims, with results which were highly satisfactory. Since then the bond has been transferred to D. D. Mann and associates, who, I understand, are planning extensive exploration-work for the coming spring."

The Engineer Mine.

The Atlin Mining Division and the Engineer Mine are next dealt with and, in view of the possibilities of the latter property, one of the most promising of the lode mines of Northern British Columbia, references to it are given in full:

This portion of the Province has been comparatively quiet for the past two years on account of the scarcity of labor and the extreme high cost of everything pertaining to mining. There has been little or no prospecting for mineral and, with the exception of two properties, no development-work. In the placer

areas there is no new ground being opened up, and where working on "pay" the lack of labor is a serious handicap.

I expect to see many of the returned soldiers take to this north country, for the life is suitable and the chances for a "stake" are good. I have no returns yet of the placer yield for the year, but I judge it will be less than last year.

The Engineer mine has been developed to the point where it justifies being exploited on an extensive scale and put in the big producer class. This will naturally stimulate lode-mining in all parts of the section.

The Engineer mine property consists of eleven Crown-granted claims situated on the southern end of Taku arm. It was owned by the late Captain James Alexander.

During the past ten years there has been a great deal of work done by way of surface-stripping, open-cutting, shaft-sinking, mining from the surface, and underground development. This work has exposed on the surface two series of veins, each radiating from a central quartz-mass or "hub," the majority of the veins in each series showing visible gold, and the hubs reported to be of milling grade ore. A 2-stamp mill was operated for several years with ore mined from high-grade surface showings and packed to it on men's backs. The record run for this mill was two hours and a half, producing 24 lb. of gold.

All the underground work, with the exception of the new crosscut tunnels now under way, has been done on the "E" vein, from which a considerable tonnage was mined from the surface. A shaft has been sunk 250 feet, from which four levels have been run on the vein. The first level is from the surface, cutting the shaft at 50 feet below the collar, and extending a further distance of 345 feet on the vein. No. 2 level, 45 feet below No. 1, has been driven 100 feet north and 190 feet south of the shaft; No. 3 level, 50 feet below No. 2, has a drift 210 feet south of the shaft; and No. 4 level, 90 feet below No. 3, has been run 145 feet north and 90 feet south. The shaft is 40 feet below the No. 4 level and shows the vein to be 2 feet wide, with visible gold on each wall. There is a bonanza shoot of ore or from 1 to 6 inches thick, widening in one place to 18 inches, showing on the second, third, and fourth levels for a length of 40 feet. The remainder of the vein, on all the levels, would be considered high-grade ore. In development-work the waste is broken ahead of the ore about 19 feet; the ore is afterwards broken down and taken to the sorting-tables on the surface, where it is broken up and sorted into three grades of ore — that showing visible gold, a second grade which is sacked for shipment, and a third grade sent to the dump for future treatment. The grade showing gold is accumulated until sufficient to run through the ball-mill, 600 to 1,000 lb. being the usual charge, in which it is pulverized in about two hours; mercury is then added and amalgamation completed in from twenty to thirty minutes. The tailings are sacked and shipped with the crude second-grade ore, which averages from $150 to $200 a ton. The record run of the ball-mill was 24 lb. 8 oz. of gold from 160 lb. of ore.

A very comprehensive scheme of development has been started. Two crosscut tunnels are being driven —the Mill tunnel from the mill-site on the beach to a point under the shaft on "E" vein, a distance of 1,200 feet, crosscutting in that distance at least five veins from which high-grade ore has been taken on the surface. This tunnel will deliver all ore from "E" vein and intermediate veins to the mill and give a depth of 500 feet at the shaft. It has been driven 309 feet. The other tunnel, called the Boulder Vein tunnel, is being driven from the level of No. 1 level in the shaft to crosscut the upper series of veins radiating from Hub B. Two of these in particular, the Boulder vein and Shaft vein, show bonanza ore on the surface. It will require between 300 and 400 feet of a tunnel to cut them; the whole series will take about 900 feet, giving a depth of 600 feet on the farthest vein. This tunnel has been driven 55 feet, and will deliver all ore from Hub B series to No. 1 shaft level, to shaft to Mill tunnel to mill. The three-compartment shaft at the head of the mill will be sunk to intercept a very rich vein cropping at the edge of the water, which can then be drifted on to Hub A, thus delivering all that ore to the shaft to be hoisted to the mill storage-bins.

The Northeastern Mineral District.

Mr. John D. Galloway has the following general observations to make with reference to the Northeastern Mineral District:

The mineral production of the North-eastern District in 1918 is expected to have been somewhat less than in 1917. The district has as yet few productive mines, although undeveloped prospects and partially developed properties are numerous. Undoubtedly many of these will repay exploitation, but during the last two years conditions have not been conducive to extensive mining development. While it is true that metal prices have been high, this has mainly stimulated actual producing mines and has not induced the development of new properties, except where quick returns were in sight. On the other hand, the scarcity, inefficiency, and high cost of labor, high cost of mining supplies, especially powder and machinery, and scarcity of capital for speculation has had a retarding effect on the development of new mining properties. It may be expected, however, that the return to normal conditions will cause greater activity in this district during 1919.

The copper-output of the district during the past three years has been largely from the Rocher Deboule mine, and this year the output from this mine has been less than in former years.

The zinc and most of the silver and lead output comes from the Silver Standard mine; this property is now in good shape to make an increased production in the future.

Considerable interest was shown in the coalfields of the Hazelton-Telkwa Sub-district during the year. The high cost of fuel-oil and the steadily increasing price of coal on the Pacific coast are conditions which have aroused interest in undeveloped coalfields. The Grand Trunk Pacific Railway during the year changed from oil-burners to coal-burning locomotives on the division from Prince George east, and it is quite possible that if a suitable local supply was available the division from Prince Rupert to Prince George would also be equipped with coal-burners.

Production of coal was started late in the fall from the Telkwa Collieries, situated four miles from Telkwa.

The production of placer gold in the district has this year been considerably less than in 1917, due to a shortage of water-supply during the season in the Cariboo Division, the main placer-producing section of the district; thus seriously handicapping hydraulicking operations.

The North-eastern Mineral Survey District contains

a large virgin field for prospecting; many areas contiguous to the Grand Trunk Pacific have been partially prospected and claims staked there, but careful examination, such as has been carried out in some of the older camps in British Columbia, has not yet been done. In addition, there is a great deal of country, both north and south of the railway, which is as yet quite unprospected, but in which the general geological conditions are favorable for the occurrence of economic minerals. It is to be expected that the return of many men to the country now that the war is ended will result in a general revival of prospecting. Undoubtedly many of the prospectors who enlisted will return to their old occupation, while the free, adventurous life of the prospector, with its promise of possible spectacular returns, will make a strong appeal to many returned soldiers who before the war had led indoor lives. The North-eastern Mineral District should secure a considerable number of these returned men who are desirous of following such a life.

During the first five months of the year 1918 the Resident Engineer was in the Victoria office engaged in preparing the report of the previous year's work and assisting in the compilation of the Annual Report of the Minister of Mines, as field-work in the district could only be commenced at the beginning of June and be continued until the end of November.

More attention was given to the Cariboo and Quesnel Divisions than in 1917, with the result—as the district is a large one—that less field-work was carried out in the Omineca Division than in the previous year. A reconnaissance in the Peace River Division was contemplated for the season, but lack of time prevented this work being effected.

The official returns for the year 1918 are not yet available, but the following estimate, it is believed, will approximate the actual production:—

Gold, placer	4,000 oz.
Gold, lode	900 "
Silver	100,000 "
Lead	155,000 lb.
Zinc	327,000 "
Copper	560,000 "
Miscellaneous minerals	$4,000
Coal	500 tons.
Total value, approximately	$375,000

Hydraulic Operations in Barkerville District.

Referring to hydraulic operations in the Barkerville district generally, and to those of some individual companies, as well as to the quartz claims of Proserpine Mountain the report says:

The hydraulic placer mines near Barkerville made a smaller production than in 1917. The water-supply during the year was not very satisfactory, so that a smaller yardage of ground was handled than in the previous year. In the early part of the season the winter snow melted with great rapidity, causing a flood of water which went to waste, and after that a long dry period occurred, during which there was an insufficiency of water for steady hydraulicking. Not much help was obtained from fall rains, so the season as a whole was unsatisfactory as regards water conditions.

Hopp Mines.—These mines, consisting of Lowhee, Stouts Gulch, and Mosquito Creek, which are operated under the management of John Hopp, were worked continuously throughout the season as the supply of water permitted. The major portion of the placer-production of the Cariboo District comes from these three properties. Stouts Gulch mine was worked up to its head in 1917, but this year the work was carried on laterally, side channels and benches being worked. There is still a considerable yardage of gravel to work out, but it may prove to be lower grade than the main channel. Lowhee mine was worked continuously throughout the season, and it is reported the average grade of gravel handled was well up to that of former years. Mosquito Creek mine was handicapped by shortage of water, and only a small yield of gold was obtained.

Lightning Creek Gold Gravels and Drainage Co.—This company carried on work at its property at Wingdam during the season with a force of about a dozen men under the superintendency of Elmer S. Will. The work done consisted of putting the surface plant of the property in shape for actual mining, which is planned for the season of 1919.

The property is an old one and equipped with a plant for deep-drifting placer-mining on a large scale. During the year the flume was rebuilt, giving more water-power, the pumping machinery was overhauled and added to, and generally the whole plant was put in good conditions.

Drilling of the ground, which has been progressing for two or three years back, was continued. The Keystone drill was operated nearly continuously throughout the season, Mr. Brown being in charge of this work.

Proserpine Mountain.—The gold-quartz claims on Proserpine mountain, which are owned by Armstrong, Tregillus, Carey, and Blair, still continue to attract considerable attention. Further development by the owners was carried on during the summer. This work was confined to surface prospecting by cuts and shallow pits. Late in the fall, however, Tregillus and partners commenced sinking a shaft, and it is expected they will continue work all winter.

There are a number of well-defined quartz veins on these claims varying in width from 1 to 30 feet. These veins are mineralized in places with pyrite, arsenopyrite, and a little galena. The main valuable metal content is gold, the distribution of which is somewhat irregular. It would seem probable that the gold primarily was associated with the sulphides, but surface oxidation and leaching have in places scattered free gold through the quartz.

From the results of many samples taken, it is evident that at least portions of the veins would pay to work, and it is quite possible that further development would show considerable tonnages of ore which would pay to mill. The ore will have to be milled on the ground, and much further development is required before a large mill would be warranted. The possibilities for these claims are that when the veins are properly opened up they will furnish sufficient tonnage to mine and mill on quite a large scale, although average values may prove to be comparatively low grade. These properties warrant a thorough investigation by any company looking for gold properties.

The Emancipation Mining Co.

One of the interesting sections of Mr. R. W. Thomson's report on the Central District is his reference to the work of the Emancipation Mining Co., Ltd., which follows:

This company has taken out three shipments during the year and is the only shipper in the district at present. Although exact figures are not to hand, the following particulars are approximately correct: Early

in the year 6 tons was treated at the Tacoma smelter and returned $6,000; later a shipment of 12 tons was treated at the Tacoma smelter which returned $1,920. The last parcel of ore sent out was a small one of about 1 ton of hand-sorted high-grade ore which was expected to net about $2,000 a ton. The tunnel, which has been driven to about 200 feet, still carries milling values in the face, but a winze has been sunk to follow the high-grade seam, which without losing its values narrowed at this point. Prospecting-work has been carried out on the Packard group, owned by this company, with very promising results. On the same lead as the Emancipation group there has been considerable excitement this year owing to the discovery of very rich free gold in the surface quartz of many of the claims. This has caused the staking of the whole lead for nearly eight miles. High-grade ore has been found on the claims owned by Toni Angelis, J. Bailey, W. Palmer, and W. McLean. Claims extend now all the way from the Emancipation group to the Emigrant Mines properties, a distance of eight miles. The past year has been the most promising since the district was first prospected.

The Southern District.

Excerpts of some of the most important parts of Mr. P. B. Freeland's Report on the Southern District follow:

Granby, Consolidated Mining, Smelting, and Power Co., Phoenix.—About 444,500 tons of copper ore was shipped from these mines to the Grand Forks smelter during the year. This tonnage is below that of 1917, chiefly owing to smaller ore-bodies and their increasing distance from the centre of operations. Sickness caused by the Spanish influenza created a shortage of labor and a reduction in tonnage.

Canada Copper Corporation.—The Mother Lode mine operated steadily until about the end of November, when the Canada Copper Corporation ceased operations at their smelter at Greenwood. About 163,382 tons of ore was shipped during this period. The Sunset mine has also closed. About 2,697 tons of ore was shipped.

Camp McKinney.

The Consolidated Mining and Smelting Company of Canada did a considerable amount of work upon its holdings in this camp during the summer. A continuance of some of the quartz leads were uncovered, showing a fair amount of mineralization.

In the fall the West Kootenay Power Company established two camps near the old Cariboo mine and commenced cutting a right-of-way for the high-power electric line which, it is understood, will pass through the McKinney camp on its way from Greenwood to Copper mountain.

Osoyoos Mining Division.

Hedley Gold Mining Co., Ltd.—This company has operated the Nickel Plate mine steadily throughout the year in spite of the increased costs in labor, supplies, etc. About 70,100 tons of ore has been crushed and treated in the company's mill.

Golconda Claim.—In 1917 3,390 lb. of molybdenite was shipped to Ottawa. On driving the main tunnel ahead on the lead, the molybdenite to a great extent disappeared and a good grade of chalcopyrite was encountered. Transportation difficulties prohibit shipping any low-grade ore from this property. About 10 tons, carrying 18.1 per cent copper, was sent to Trail.

Similkameen Mining Division.

Canada Copper Corporation, Ltd.—The chief energies of this company during the year have been confined to building a 2,000-ton concentration plant at their mill-site, situated about four miles from Princeton. In connection with this plant, the erection of houses for their employees, a school-house, and every facility necessary for the welfare of families has been thought of. A branch of the Kettle Valley Railroad from Princeton to Copper mountain is under construction at the present time.

At the mine, on Copper mountain, work practically ceased during the summer; all the development-work having been done that was necessary until the concentration plant has been installed. A more detailed account of this mine and its mill will appear in the 19 Annual Report of the Minister of Mines.

Tulameen River.

The strong demand for platinum caused a great deal of activity in the vicinity of the Tulameen river. Besides numerous small placer-workers, the Munitions Board, of Ottawa, under the direction of G. S. Mackenzie, did a considerable amount of drilling, with the intention of ascertaining the possibilities of working the gravels profitably for platinum.

It is improbable that the price of platinum will keep up to its present price for any length of time, and the drilling of these gravels and the ascertaining of the quantities, if any, of platinum is seemingly necessary, to provide against any such contingency as that which arose during the period of the war.

Olivine Mountain.

A Vancouver syndicate obtained some holdings on this mountain early in the year, and prospected it with a view of mining certain localities for platinum and chromite. Some segregations of the chromite have been found to contain platinum in small quantities, but these segregations are so scattered that profitable mining is at present out of the question.

On the north side of Olivine mountain some good showings of copper sulphides and carbonates have been uncovered by Andy Jensen, of Tulameen. Assays from these showings run up to 4 per cent copper. The locality is worth of some investigation.

The Eastern District.

Mr. A. G. Langley, of the Eastern District, includes in his report the following interesting notes:

Sitting Bull.—Very little work has been done on the property during the year by the owners, pending the installation of a compressor plant, which they propose to make as soon as the new road up Boulder creek is built. The future development-work will consist of driving an adit-tunnel at a location easily accessible and free from snowslides to tap the vein at a lower level. Ore is exposed in the upper workings along the course of the vein, but on account of the rugged and steep nature of the country these workings cannot be worked with safety during the winter months. Some 30 tons of high-grade silver-lead ore are ready for shipment.

Trojan Group.—This group comprises six claims and is situated on Boulder creek at a distance of eight miles from Athalmer, the nearest point on the railway. Access is gained by a good wagon-road to within three miles of the property, and for this distance there is a good 4-foot trail. The property formerly known as the Delos group was bought by the Trojan Mining Corporation, a company promoted in Spokane by F. Wonn, who is also largely interested in the Sitting Bull mine. E. D. Smith is in charge of the development-work. The ore occurring in the quartz-filled vein is principally chalcopyrite, with occasional

values in gold and silver. A sample of ore from an open-cut on the surface ran as follows: Gold, a trace; silver, a trace; copper, 15.5 per cent. There were between two and three car-loads of ore ready for shipment, and the manager now reports that he has nearly 300 tons available, and which he hopes to haul out during this winter. During the year development has been confined to surface work along the outcrop and to the continuation of the old tunnel. Surface improvements consist of commodious camp buildings suitable for a crew of about twenty-five men. The new road up Boulder creek, which has been completed for a distance of five miles, leaves the main road up Horse Thief creek at a point of 7.4 miles from Wilmer.

Fort Steele Mining Division.

Sullivan.—This mine, which is by far the largest producer of lead and zinc in British Columbia, has been steadily operated by the Consolidated Mining and Smelting Company, who report that there is an immense tonnage available for extraction and treatment. The output of this mine, which could be worked to much greater capacity, just about equals the total output of lead and zinc of all the other mines in the Province. Latterly about 300 men have been employed at the property. Shipments for the year are as follows: Lead ore, 30,554 tons; zinc ore, 96,950 tons; and iron pyrites, 4,582 tons. The long adit-tunnel which is being driven from Mark creek is now in about 4,600 feet.

Ainsworth Mining Division.—Near Ainsworth.

Bluebell.—This mine has been operated steadily during the year under the management of S. S. Fowler. On account of a large flow of water, work has been discontinued in the lower workings of the mine, pending the installation of a new pump. The concentrator has not been run during the year, the output of the mine being derived from a large body of oxidized silver-lead ore on the surface. This was extracted by "glory-hole" method and taken out through an adit-tunnel. During the year over 5,000 tons of crude ore was shipped to the Trail smelter.

Florence.—This property, consisting of eight Crown-granted claims, is owned by the Florence Silver Mining Company, of which F. R. Wolfle is manager and Hewer mine superintendent. The mine is developed by means of over 10,000 feet of underground workings. The concentrator, which is situated on the shore of Kootenay lake, is said to have a capacity of 150 tons. Water-power to run the plant is developed on Woodbury creek under a 350-foot head. A large gang of men was employed by the company during the year, and over 2,000 tons of silver-lead-zinc concentrates was shipped to the Trail smelter.

Near Kaslo.

Cork-Province.—Mining and development work have been actively carried on during the year under the management of W. E. Zwicky. The production shows a substantial increase over that of last year. A Minerals Separation flotation plant consisting of fourteen 4 x 12 cells, three Wilfley tables, a Dorr classifier, and other equipment was added to the mill during the year. About 800 tons of silver-lead concentrates has been shipped to Trail during the year. Latterly the property has been temporarily closed down.

Curle Manganese Group.—This property, which is situated on the Kaslo & Nakusp Railway at a short distance from Kaslo, was partly developed by Col. Mill, of Spokane. The first shipments contained such a high percentage of moisture that it was found necessary to install a dryer. The results evidently did not meet with much success, and after shipping fifteen cars of ore the property was closed down in October. The ore runs from 34.5 to 49.5 manganese, is low in silica and iron, and may be classified as a good grade of wad. It is possible that the failure to make a success of the venture may be attributed to unfamiliarity with mining and treatment methods for this class of ore.

Sandon Camp.

Conditions in the Sandon camp have been better than for many years past, and the prospects for a large increase in production from the surrounding district is most encouraging, providing market conditions remain favorable.

Clarence Cunningham, who has been carrying on progressive mining and development work at his various properties, has done a lot to stimulate the industry in the Slocan and elsewhere.

Besides the Queen Bess, which is proving to be one of the richest mines in the Division, he is operating the following properties, in which, all told about 250 men are employed: Idaho-Alamo, Sovereign, Wonderful, Van-Roi, Hewitt and Wakefield.

At Alamo a 150-ton concentrator is nearing completion. The plant will be operated by water-power developed from the North fork of Carpenter creek.

The Surprise Mining Company has also been very active this year, and recently acquired the Ivanhoe group and adjoining claims of the Adams group. The company is also operating the Bosun mine, where sixty men are being employed. The ore from this mine is concentrated at the Rosebery mill. The entire output from the properties operated by this company is shipped to the United States for reduction, under arrangements of a long-term contract.

Slocan Star.—This mine is now being operated by the Silversmith Mines, Limited, under the management of R. H. Stewart. A large shoot of ore was recently developed on the tenth level, which is the lowest point in elevation in the Sandon camp at which ore has been developed. After nearly a year's idleness the mill was again started in October, and it is to be now hoped that the mine will once more rank among the leading producers of the district.

Silverton Camp.

This camp has been a little quieter than usual on account of the temporary close-down of the Standard mine, which for many years has been the leading shipper of the Slocan. However, further development-work is being done, and it is to be hoped that before long it will again become one of the large shippers. In the meantime the mine is being partly worked under lease by L. McPhee and partner. Small shipments are now being made to Trail.

Echo.—This mine, situated above the Standard and on the same lead, promises to be an important shipper in the near future. Arrangements have been made to lease the Standard mill, and a tramway has been built from the mine to connect with the Standard tram. J. P. Bonner is mine superintendent.

Queen.—This property, together with the Vancouver Kootenay Belle, and Alexandria claims, has been bonded by A. W. McCune, of New York, who has for many years taken an active interest in the mines of the Kootenay district.

Due to economic conditions brought about by the high price of labor and supplies, the Queen closed down in 1916, having produced up to that date over a mil-

lion gollars in gold. Work has been commenced on a crosscut tunnel running south-easterly across the various properties. The erection of a 200-ton mill is contemplated, should the development come up to expectations. The above may be considered the most important development-work now taking place in the Nelson Division, and will have a far-reaching effect on the Sheep Creek camp.

The following is a list of shippers of the Slocan Mining Division, giving the approximate tonnage shipped or milled by each property during the year:—

	Ore Tons.
Anna group, Sandon	17
Best, Rambler	37
Canadian, Sandon	11
Echo, Silverton	90
Freddy Lee, Sandon	40
Gem, Sandon	70
Idaho-Alamo, Sandon	127
Ivanhoe, Sandon	53
Jo-Jo, Three Forks	10
Lucky Jim, Zincton	6,450
No. 1, Sandon	81
Noonday, Sandon	5
Payne, Sandon	72
Queen Bess, Sandon	2,710
Rambler-Cariboo, Rambler	10,000
Reco, Sandon	19
Richmond-Eureka, Sandon	66
Silversmith, Sandon	2,940
Sovereign, Sandon	84
Surprise, Sandon Bosun, Sandon	16,500
Wonderful, Sandon	32
Standard, Silverton	45,000
Galena Farm, Silverton	15,000
Van-Roi, Silverton Hewitt, Silverton	8,000
Lucky Thought, Silverton	129
Molly Hughes, New Denver	19

Rossland Camp.

The output of the Le Roi-Centre Star group has exceeded that of last year, although the production of these mines was greatly curtailed during the latter six months of the year on account of economic conditions not being favorable for the mining and treatment of low-grade ores.

Of the other mines, the production of the Le Roi No. 2 shows a substantial increase over that of last year, while that of the White Bear compares favorably with the previous year.

The Velvet mine has been taken over by the Granby Consolidated Mining and Smelting Company, who have had a crew of men steadily employed at development-work.

The following list shows the approximate amount shipped by each property during the year:—

	Tons.
Centre Star-Le Roi	89,374
Le Roi No. 2	18,416
White Bear	1,408

Revelstoke Mining Division.

Lanark.—A hydro-electric plant capable of developing 250 horse-power has been installed on the Illecillewaet. The power is used for running the concentrator and the compressor at the mine. Operations at the mine consisted of further development-work and the prospecting of a new lead which shows up strongly on the surface for a distance of approximately 20 feet. W. B. Dornberg is manager. Ten or twelve me are employed.

Woolsey Group.—Situated on Silver creek at a d tance of seven miles from Albert canyon. A good tr from the Illecillewaet river to the claims was co pleted, as was also a bridge across the river. Qu a little excitement was created by reports of the pro erty being bonded to the Mining Corporation of Ca ada. C. E. Watson, general manager of the compa was prepared to proceed with the development of t claims under an option and upon the recommendat of his engineer, R. O. Randolf. Both of these gent men lost their lives in the wreck of the "Princ Sophia," and it is reported that the deal has fal through. Cabins have been erected on the claims a everything is in readiness for next season's work. Th vein is strong and well defined, having a width i places of about 15 feet and containing some excell t exposures of silver-lead ore near the surface. Th continuity of the ore has still to be proven by furt r development; very little prospecting has been d e on the vein so far. The ore is principally galena, wi a little zinc-blende. The silver values run as high s 80 oz. The zinc and lead are not intimately mix d, while the gangue is quartz, conditions which mad it an ore admirably suited for concentration.

The Western District.

General conditions during the year are summari d by Mr. Brewer, of the Western District, as follow

During the past year, while there has been no phenomenal progress in coal and metalliferous mi g in the district, there has been a steady advance, wh h would have undoubtedly been more marked ex pt for the difficulty in obtaining capital, labor, and o- toms for the shipment of ore to Coast smelters. Th epidemic which raged throughout Canada and he United States during the last quarter of 1918 ha a very marked effect on the mining industry gener ly as in many camps there was fully one-third of the or mal force of workmen absent from work either by ea- son of their own sickness or because of sickness in th families. This was particularly noticeable with re gard to the coal-mines and the Britannia cop r mine.

The high cost for labor and supplies, together wi the difficulty in obtaining capital, deterred the p e cution of much development-work in metallife ous mines, but to a great extent this has been offse by new development-work that has been done by the co liery companies of Vancouver island, which wi l referred to in detail later in this report.

At the beginning of 1918 it was anticipated th the lack of smelting facilities in this district, o in to the closing-down of the Ladysmith smelter d in the later part of 1917, would be removed by that s e er being blown in early in 1918, but all hope from h source had to be abandoned, as the smelter ha r mained idle except during a few weeks last sum r when about 2,000 tons of copper-gold ore that h accumulated earlier in the year was smelted, af which the plant was again closed down and is idle.

Wages paid to all classes of miners have adv ced steadily during the year, and to such an exten tho many coal-miners are receiving as much as $10 da and upwards, and the minimum wage since th las increase made on November 1st is about $5 a day Wages in the metalliferous mines have been adv ced

from time to time during the continuance of the war to keep pace with the advancing price of metals. This fact has had a deterrent effect on the progress of gold-mining, because the price of that metal is fixed and does not fluctuate; but, so afr as this district is concerned, gold-bearing ores are rarely found, except such ores as carry gold values in association with other metals, and generally the gold content in such ores is very low.

Fortunately there have been no labor troubles that resulted in strikes in this district during the past year, although such were threatened, but the questions in dispute were settled by conferences in which the employers, employees, and Government officials participated.

Early in the year there was considerable agitation with regard to promoting the iron and steel industries in the Province, and as the great bulk of the known iron-ore deposits that occur in British Columbia are found on Vancouver and adjacent islands, this movement naturally created much interest in this district. It resulted in the engagement of Dr. Alfred Stansfield, of Montreal, by the Hon. the Minister of Mines to investigate and report on the possibilities and feasibility of smelting the magnetite ore in electric furnaces. The report has not yet been published, so it is impossible to discuss it in this preliminary statement.

The discovery of a good grade of manganese ore in deposits which promise to develop into ore-bodies of considerable extent was made in the mountains adjacent to Cowichan lake, Vancouver island, during the past summer. Owing to the demand for ferro-manganese on account of the war, this discovery created a good deal of interest, which, however, abated to a great extent when the armistice was signed. The future importance of the occurrence of this mineral will now depend upon demand and supply, which govern the markets of the world, and whether the demand for ferro-manganese on the Pacific coast is sufficient to warrant the erection of furnaces in British Columbia to supply the demand. A large number of samples taken by different mining engineers from the Hill 60 group of mineral claims, which contain the deposits most easy of access, assayed from 40 to 50 per cent manganese, with the silica content of those samples between 13 and 18 per cent, with no iron or phosphorus.

Considerable prospecting was done during last summer for molybdenite ore, and occurrences of that ore were found on Buttle mountain, near Cowichan lake, Vancouver island, also on the mainland near Agassiz, and on the upper Stave river, as well as in the Cheam range, about twenty miles east of the town of Chilliwack. The development-work done on the various mineral claims that contained deposits of this ore was quite limited in extent and no production was reached.

The development-work done on metalliferous mines in the Western Mineral Survey District during 1918 was confined principally to the Britannia, Marble Bay, Sunloch, Old Sport, Monitor, Indian Chief and Blue Grouse mines, which will be further referred to later in this report.

There was a discovery of seepages of oil in the vicinity of Burnaby lake in the spring of 1918, on Land Section 130 in the south-east corner of Burnaby Municipality. The seepages were examined by the writer during the early part of May, and a sample taken showed from analysis that the oil has a paraffin base. The pool sampled was at the root of an old tree, about 4 feet deep and full of oil and water. The seepages appear to occur along a zone where holes had been sunk with a post-auger by J. B. Woodworth, lessee of the land section, some to a depth of 15 feet, in peat marsh, and oil-scum was noticeable on the surface of the water in several of the holes in the marsh.

Later in the year the lessee and associates organized the Spartan Oil Company, Limited, and after securing the advice of W. R. Jewell, Kansas City, U.S.A., geologist and petroleum engineer, decided to bore a test-hole with a diamond drill at the point selected by Mr. Jewell. This work is progressing at the time of this writing, the drill having reached a depth of 875 feet, with the core showing that the drill is boring in sandstone at that depth.

Copper ore carrying varying values in gold and silver was shipped during 1918 from the following named mines in the Western Mineral Survey District: Britannia, Marble Bay, Blue Grouse, Ingersoll, Indian Chief, Monitor, Willow Grouse, and East Sooke. The Britannia and Marble Bay were the only regular shippers, the other mines mentioned being irregular or spasmodic. During the coming year it is expected that the number of shipping mines in this district will be increased by the addition of the Sunloch, on Jordan river, and possibly the Yreka and Old Sport, on Quatsino sound, as well as the Lucky Four, in the Cheam range, near the Canadian Northern Pacific Railway.

Iron ore was shipped during 1918 from the bog-iron ore deposit near Mons, on the Pacific Great Eastern Railway, and from the Good Hope mineral claim, on the east coast of Texada island, all of which was treated at the Irondale furnace, in the State of Washington.

The Britannia Mine.

After devoting considerable space to coal mining operations Mr. Brewer describes the activities of the Britannia Mining Company, one of the big producing concerns of the Province, as follows:

Britannia Mine.—The operations of the Britannia Mining Company are, of course, far more important than those of any other company in the Western Mineral Survey District, and for that reason the following description of development work and improvements that have been carried on during 1918 are given in more detail in this preliminary report.

The following shows the development work performed in the mine: Drifts, 9,837 feet; crosscuts, 4,427 feet; raises, 8,754 feet; chutes, 1,541 feet; winzes, 36 feet; total, 24,595 feet.

Development-work.—In the Fairview mine drifts have been extended on previously developed veins, also new ones have been opened up to the south, on which stoping operations have started. The outside glory-holes were worked during the open season (seven months), breaking ore on top of the mountain into large transfer rock-chutes delivering it to the underground crushers with but one handling.

The Bluff mine to the west and the Empress mine to the east of the Fairview have been extensively developed during the year and stoping has been started. Two drifts are being driven west under the Jane mine on the 1,200-foot level, developing this ore-body 200 feet below any previous working-level.

During the year another connection through Britannia mountain was made, this being on the 600-foot level, making the fourth level to have portals on both the north and south side of the mountain. Two other levels, the 1,200 and 1,600, are being driven through

for connection, the former having approximately 1,600 feet to go and the latter 700 feet.

Work is progressing for the extension of No. 1 shaft from the 1,000-foot level to the 700-feet level, and also the extension of the Grandview shaft (No. 3 shaft) from the 500-foot to the 700-foot level. This construction will in time supplement the No. 2 shaft, now operating between the 1,000-foot and 500-foot levels.

A crosscut adit, 8 x 8 feet, known as the Victoria tunnel, to the east of the present Empress workings, at the elevation of the 1,800-ton level, has been advanced 400 feet to prospect the extension of the veins in that section of the property. Another crosscut, 8 x 8 feet, known as the Hillside tunnel, is being driven at a point west of the present Jane mine at an elevation of the 1,000-foot level. This has advanced approximately 200 feet.

Considerable diamond-drilling has been done during the year, prospecting new areas and also to prove the extension of known ore-bodies. The footages driven in the different mines are as follows: Fairview, 15,062 feet; Empress, 4,897 feet; Bluff, 2,404 feet; Jane, 2,071 feet; 3,100-foot tunnel, 690 feet; 2,700-foot tunnel, 1,558 feet; total, 26,682 feet.

The 4,100-foot level tunnel, the portal of which is about the level of the roof of the mill, was advanced 1,735 feet during the year, making the total length 4,220 feet. This tunnel will eventually be used as the main haulage adit. A raise has been started at this level and driven a distance of 100 feet. This raise will be continued to the 3,100-foot level, a distance of 1,130 feet, and from there to the 2,700-foot level, 370 feet. This raise is 7 x 12 feet and is being driven on a 65-degree slope.

The 3,100-foot level east drift was advanced 659 feet, and from this drift another drift 260 feet long has been driven to the location of the proposed raise from the 4,100-foot level, from which point it is proposed to raise to the Armour crosscut, 2,700-foot level, at the westerly end of the tunnel railway. The Armour crosscut has been driven a distance of 502 feet.

The raise from the 4,100-foot level to the 2,700-foot level will be used to transfer the mine ore to the 4,100-foot level, and thence a distance of about 5,000 feet by railway to the mill.

The 2,200 Daisy tunnel was advanced 910 feet, making the total length 1,309 feet, and a crosscut 106 feet long driven to the south.

The Harp tunnel was advanced 811 feet to completion during the year. This tunnel is 2,246 feet long and will be used to divert water for power purposes.

The following tunnels driven for development-work were advanced during the year: Lantz tunnel, advance for year, 60 feet; footage to date, 890 feet. Lloyd tunnel, advance for year, 71 feet; footage to date, 134 feet. Copper mountain tunnel, advance for year, 152 feet; footage to date, 324 feet.

Equipment.—Four Westinghouse 3½-ton storage-battery mine locomotives were added to the previous equipment of eight, in addition to which there are in the mine one 6-ton General Electric trolly locomotive and two 3½-ton Westinghouse trolly locomotives.

Fifty-four 2-ton automatic side-dump cars were added to the mine equipment, making a total of approximately 150 cars of this type. Besides these, twenty cars of the same type and size, but built for a 3-foot gauge, were added to the equipment for handling ore broken on the 2,200-foot level and for outside tunnels having a 3-foot gauge.

The present equipment of the tunnel railway consists of ten 20-ton bottom-dump cars; twelve 20-ton side-dump cars; two flat cars; four 15-ton electric locomotives; one 8-ton electric locomotive; and one 40-ton electric locomotive. The 40-ton locomotive was added during the year.

The present equipment of machine-drill sharpeners, including those located at outside tunnels, as well as at the mine proper, consists of nine Leyner machines, four Sullivan, and one Waugh.

A 3,600-cubic-foot-per-minute compressor, driven by a 600-horse-power output motor, was installed in the Beach power-house.

No new buildings were erected at the mine, with the exception of a concrete storage or root house; outside dimensions 38 x 30 feet, with an inside height of 9 feet at the crown of the arched roof. This is located at the tunnel cook-house and affords an excellent place for the storage of winter vegetables.

Profits of B. C. Mining Companies.

The following statement shows the dividends declared by operating metalliferous-mining companies during the calendar years 1914, 1915, 1916, 1917, and 1918:

The amount of $2,691,592 shown above as distributed profits for the year 1918 by no means represents the total of net profits earned during that year. A glance at the published accounts of several of the companies for their respective last fiscal years will make it clear that in these several instances there was as well a substantial sum placed to the credit of Profit and Loss Account.

It will be noticed that the Standard Silver-Lead Company suspended dividends in 1918, although the company operated and made a profit. None of the coal companies are listed as dividend-payers, but doubtless profits were made. Similarly, profits accruing to small companies and individual mining enterprises as a rule are not given publicity as dividends as is the case with the large companies, so that no record of these profits, which in the aggregate are considerable, is available.

Name of Company.	1914.	1915.	1916.	1917.	1918.
Consolidated Mining and Smelting Co., Trail	$ 464,376	$ 493,425	$ 841,050	$ 996,503	$ 047,744
Granby Co.	449,955	449,955	1,049,896	1,499,848	1,499,848
Standard Silver-Lead Mining Co., Silverton	475,000	250,000	600,000	300,000	.....
Hedley Gold Mining Co.	300,000	300,000	240,000	240,000	144,000
Le Roi No. 2, Ltd., Rossland	.....	58,440	.....	29,199	.....
Rambler-Cariboo Mines, Ltd., Three Forks	.....	35,000	70,000	35,000	.....
Utica	.....	.....	.....	64,000	.....
Mother Lode	.....	.....	137,500	.....	.....
Totals	$1,689,331	$1,586,820	$2,938,446	$3,164,550	$2,691,592

Developments in Northern Manitoba

Survey for the Railway From The Pas to Flinflon Copper Property.

The reconnaisance survey for the railway from The Pas to the Flinflon copper property has been completed by J. P. Gordon, acting for the Canadian National Railway. There were two alternative routes in mind. The first was in a northerly direction from The Pas to Cranberry Portage, at the east end of Lake Athapapuskow, and thence westwards along the north shore of Lake Athapapuskow to the Flinflon property. This route, although somewhat longer, would have the advantage of passing through a part of the mineral belt east of Lake Athapapuskow where several discoveries have been made, and where the proximity of the railway would lead to rapid development. The other route follows the west shore of Lake Athapapuskow and thence northwards past the Mandy property to the Flinflon area. It has been found that this is the more practicable route, as a line along the north shore of Lake Athapapuskow would necessitate very heavy building across the strike of the rock. As the railway would touch the west arm of Lake Athapapuskow, which is throughout a navigable lake, the property along the shore of this lake would be connected by water with the railway.

Developing Copper Deposits Along H. B. Railway.

Interest has been recently taken in copper properties in close proximity to the Hudson Bay Railway from Mile 168 to Mile 195. Prospecting has been carried on here for the last four years, and high values in copper have recently been obtained at a depth of 60 feet. The transportation situation is very attractive. It is understood that deals are going through which will lead to early development. These claims are also of interest in that they indicate the continuation of the copper belt considerably further east than good values have previously been obtained.

C. P. R. May Tap Western Section of Pas Mineral Belt

It is also of interest that the Canadian Pacific Railway authorities contemplate the building of a railway from Lanigan northwards to Cumberland House on the Saskatchewan River. It would appear that this projected railway is pointing northwards into the western section of the mineral belt.—R. C. W.

CANADIAN MINING INSTITUTE.

The following will be elected by acclamation as Members of Council of the Canadian Mining Institute:

Vice-Presidents: Balmer Reilly, Cobalt, Ont., and John T. Stirling, Edmonton, Alberta.

Councillors: J. A. Allan, Edmonton, Alberta; R. C. Wallace, The Pas, Man.; Thos. Cantley, New Glasgow, Nova Scotia; Alfred J. Tonge, Glace Bay, Nova Scotia; Robt. A. Bryce, Toronto, Ont.; E. T. Corkill, Copper Cliff, Ont.; Geo. H. Gillespie, Madoc, Ont.; Jas. G. Ross, Montreal, and H. T. Russell, Montreal.

Mr. D. H. McDougall has been re-elected a member of council of the Engineering Institute of Canada.

A. I. M. E. ANNUAL MEETING.

Lessons learned from the war by the American mining world will be applied toward greater progress in American mining at the 119th Meeting of the American Institute of Mining Engineers, which will be held in New York during the week of February 17th. Prominent members of the Canadian Mining Institute, National Research Council, the American Institute of Electrical Engineers, will join the American mining experts in their discussions.

At no period in the history of American mining have the problems of production, especially as to labor and scientific processes, been so momentous as to-day, and at this meeting important readjustment plans will be presented. The program calls for ten business sessions, at which some forty subjects will be presented; a number of social features of a metropolitan kind, and an all-day excursion to the Federal Shipyard in Newark Bay where the first electric-welded ship is being built.

It is expected that this meeting of the Institute will be attended by mining experts from every state in the Union, and from a number of foreign countries, who are identified with the most important mining operations now going on. Many of these men have in the past two years been serving the Government in their respective fields, and scores of them have been dollar-a-year men at Washington.

At the joint session with the electrical engineers there will be six important papers on the subject of electric-welding. Some of these officials of the National Research Council and Emergency Fleet Corporation, who have participated in the development of electric-welding which has made great strides forward in the war work of the last two years.

The Institute meeting will open on Monday morning, February 17th. Tuesday will be Canadian Mining Institute day, and Wednesday will be featured by the session with the electrical engineers and the National Research Council session, followed by the annual banquet in the evening. The excursion to the shipyards will take place on Thursday, February 20th.

The officers of the American Institute of Mining Engineers are: Sidney J. Jennings, President; L. D. Ricketts, Philip N. Moore, Past Presidents; C. W. Goodale, First Vice-President; George D. Barron, Treasurer; Bradley Stoughton, Secretary.

FLIN-FLON.

During the past few weeks the following story has been published in some of our newspapers. We are unable to obtain any confirmation of it. "It is rumored that the British Mineral Resources Commission may take over the copper deposit at Flin-Flon, and develop it as a national utility. There are 25,000,000 tons of copper sulphides blocked out there, with an estimated value of $250,000,000. The world needs this wealth of minerals, and it is urged that the government, through the commission, take over and nationalize it for the people. The proposition is thought to be too large for private interests to develop, and it is stated that there is very little likelihood of the present owners going ahead on account of the huge amount of capital required to make a start."

A RAILWAY TO FLIN-FLON NEEDED.

Regarding the recent trip of Mr. J. P. Gordon from The Pas to Flin-Flon, "The Pas Herald" says:

Mr. Gordon declined to discuss his trip in detail, but he thought the road could be built at a light cost, with light grades and curvatures and light bridging. He stated that the distance would probably be near 75 miles, and with sidings and terminals the total steel required would figure around 82 miles. In his opinion this railway would have great scenic value, in addition to the great commercial value for which it is intended to be constructed.

It is known that the owners of the sulphide ore mine at Flin-Flon have stated that "We cannot attempt to treat or develop this ore body without transportation." Mr. John Black, head of the syndicate controlling it, advises that it is definitely determined that 25,000,000 tons of ore lies at Flin-Flon lake, and he adds that this is a very low estimate. It is estimated that the railway from The Pas will cost two million. The Mandy mine, with thousands of tone in reserve, is not included in this estimate, and neither are the numerous small prospects scattered throughout the Athapapuskow copper field.

This railway, when built and in operation, will not only serve the Athapapuskow copper field, but it will, in addition, be the main highway of Northern commerce, such as fur and fisheries, and the tungsten and iron deposits at Puckatawagan.

Mr. Gordon's trip is preliminary to a survey, and it is expected that this will be done while the weather conditions are favorable for getting in supplies and in getting over the ground.

MORE BRITISH MANUFACTURES ON FREE LIST.

The British Trade Commissioners in Canada (Mr. G. T. Milne at Montreal, and Mr. F. W. Field at Toronto), have received cable advices from the Department of Overseas Trade (Development and Intelligence), that a wide range of British manufactures have been placed on the free list, and now require no export license:

Lists of goods for which export licenses are still required for shipment from the United Kingdom will shortly be in the hands of the British Trade Commissioners noted above. They will also be advised weekly, by cable, by their department in London of the goods removed from such list and any alterations thereto. The British Trade Commissioners will be glad to take up these matters with local importers, and others interested.

The following are some of the principal commodities for which licenses are still required: Abrasives, agricultural machinery, cement, chemicals (various), coal and coke, oils, pipes (cast iron), packing cases, railway material, resins, coal tar products, copper (wrought and unwrought, including wire); alloys, dyes, foodstuffs, food for livestock, glue, iron angles, bars, billets and constructional material, steel angles, ingot plates and similar raw materials, textile machinery, textile yarns, fibres and waste, tin plates, war material, wire rope, wood and timber. The prohibition of the exportation of raw materials does not extend to goods manufactured from such materials.

MANAGER BRIGHAM'S REPORT ON HOLLINGER.

Significant statements appear in the general comments of Manager A. F. Brigham on operations Hollinger mine in 1918. He says:

The tonnage is approximately as shown in la year's statement, as no effort was made to effect an increase in the face of greatly adverse labor conditions and high prices for supplies. We have, however, kept abreast of a materially increased tonnag All veins have generally maintained their values, an in the case of No. 84 marked improvement has ol tained between the 425 and 800-feet levels. Belo the 800-feet level work has practically been suspend ed pending better conditions as noted above.

The ease and efficiency with which the tonnag treated during the year was handled, indicates tha we have no cause to anticipate anything but satis faction from this department.

Anything that has been said or written about th effect of shortage of labor and high prices for ma terial upon working costs during 1917 applies wit greater emphasis during 1918 and is reflected in ev ery item of the statements.

The disabilities under which the gold mining in dustry has been carried on owing to the transitor habits and shortage of miners, obtained its maximun when, in November, the number of men engaged un derground reached the low figure of 482 as com pared with 849, the highest. We had for competitor the silver, nickel and copper mines, which could ad vance wages easily, as the price of their product in creased. We, on the other hand, soon got to our lim it, as the price of gold did not move.

Now, however, with peace assured, all are thankfully and hopefully looking to the future for a return to more normal conditions when the slow process of readjustment is completed.

CLAIMS AT PINEROOT WILL BE DEVELOPED.

According to "The Pas Herald," six mining claims at the mouth of the Pineroot river, in the Athapapuskow copper field, belonging to Messrs. E. L. Masterson, Dr. Robertson, W. J. Young and J. Maxwell, of The Pas, have been optioned to C. W. Greenlees, of Duluth, for $135,000. A cash payment of $1,000 was made for the option, and the terms of the sale are that the payments will be made in three instalments extending over a period of three years. Mr. Greenlees agrees to keep five men permanently at work developing until the payments are all made .

These claims were staked in 1914, and considerable stripping has been done. The discovery was made on copper sulphides, and this appears to be the chief ore content. Mr. Greenlees, it is understood, is representing Duluth interests. He is a mining engineer, and has spent some time in The Pas field.

Not far from this group of six claims is located the Chica group, where a diamond drill was operated during the summer of 1918. The Chica is said to be backed by Steel Trust officials. The Pineroot river has come into prominence more recently, owing to the activities of prospectors in that vicinity, and also on account of the report that the Chica will resume diamond drilling in the spring.

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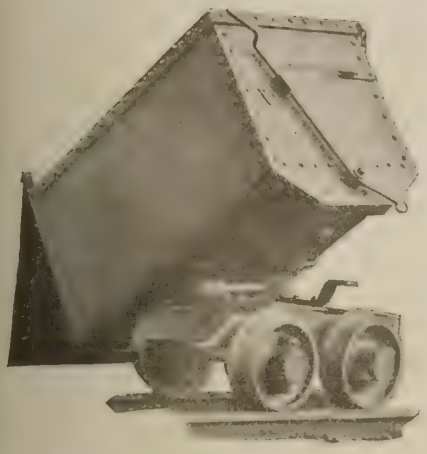

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1 4x8 Marathon Mill, with 7 tons of grinding rods from 5/8 to 1¼ in. diameter, and 7 tons extra 1¼ in. rods. The delivery of this mill was too late for the purpose for which it was bought, so it has not been used.

1 12-in. x 15-in. two-drum Jenckes Tandem Hoist, with one 20-in. auxiliary drum and one nigger-head mounted on the shaft extension. Second-hand, but in good condition.

1 Steel Mast, 11 x 17 inches, 45 or 60 feet long, equipped with all sheaves, foot castings and swivel top piece for 12 guy wires.

1 1 cu. yard Mansfield back dump Excavator Bucket, second hand.

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COBALT, :: ONTARIO

C. P. R. ASKS FOR CHARTER FOR LINE TO THE PAS COPPER FIELDS.

In the Canada Gazette of January 18 there appears a notice of the intention of the C. P. R. to apply to this session of Parliament for a charter to construct a railway line to The Pas copper fields.

The application is based on the desirability of tapping the great mineral belt of The Pas, and connecting it by direct line to every large point in the prairie provinces, and particularly to furnish direct transportation from the coal fields of Alberta, and for the economical transportation of western grains to tide-water, via the Hudson Bay Railway.

The preamble of intention indicates that the proposed line will be constructed from Lanigan, on the Pheasant Hills branch, in Saskatchewan, and in a norther-easterly direction to Cumberland House, passing through the rich Carrot river valley and near Melfort.

THE SMELTER RATES INQUIRY.

Having visited the management of the Consolidated Mining & Smelting Co. of Canada at the Trail Smeltery, where a full discussion took place regarding their investigation and its scope, the members of the Committee of Inquiry into the rates charged for treatment of custom ores at Trail, is engaged in making preparations for the securing of evidence from all who are interested. In this connection a circular has been issued and is being distributed among all shippers independent of the company. It reads as follows:

"This committee has begun its work. While it has extensively advertised its wish to receive either oral evidence as to facts or opinions of shippers of ore to Trail concerning their relations to the smelter, it feels that further opportunity should be afforded for hearing from any who have thus far failed to make their position known to the committee.

"For this reason a copy of this letter is being sent to all shippers to ask their wider and continued cooperation towards making our investigation completely successful and satisfactory to all concerned.

"Appreciating the fact that some shippers may naturally not desire to make statements in any public way, we wish to impress on you and them the fact that we are quite prepared to afford every reasonable opportunity for private hearing and discussion and that we will endeavor to make arrangements for this if necessary after hearing from you.

"We wish particularly to have it known that it is not only the matter of rates and charges as such that come within the purview of our work but the collateral matter of sampling, settlement, or anything else which may, and often does, cause dissatisfaction.

"We shall be glad to receive any communication or complaints touching these matters and trust that such will be sent to the secretary not later than the 12th February next."

Mr. Clifford E. C. Smith, who was nominated for election as a councillor of the Canadian Mining Institute, has declined the nomination on the ground that Ottawa should be represented. Mr. Geo. Mackenzie, of Ottawa, was nominated, but his nomination was invalid owing to late delivery of the mail. Mr. Smith favors the renomination of Mr. Mackenzie.

CANADA COPPER CORPORATION.

A large part of the machinery for the concentrating mill to be installed at Allenby, B.C., by the Canada Copper Corporation has reached Princeton, a few miles from its destination, and is awaiting the completion of the branch railway to Allenby. This line now is almost completed. It is understood that no time shall be lost in preparing the mill for operation, as arrangements otherwise are well in hand for the shipment of ore from Copper Mountain.

"The conditions surrounding the business of the Canada Copper corporation generally speaking, and particularly the completion of the underground program at the mine and the progress in the construction of the mill, have been entirely satisfactory, the schedule set for this work having been maintained to date, despite the usual condition affecting all industries which has existed during the period," says President Mayer in a New York report. "It appears to me, and to the engineers directly in charge of the construction work, and therefore most familiar with the conditions, that the estimate made that the plant should commence operations this coming summer, will be realized."

"In view of the fact that ample ore had been developed to supply the mill for many years, the mine was shut down in September, sufficient development work having been done to quickly place the mine in a position to supply tonnage to the mill on its completion. The mine camp at this time is completely closed down.

"The expectancy of developing considerable additional ore remains the same and a substantial area is still to be prospected to confirm the unknown possibilities in this direction."

"WAR TEMISKAMING."

The Temiskaming district will soon be known throughout the British Empire as the district that established a record in Canada as subscribers to the Dominion Victory loan. The means to let the world know of its patriotism will be furnished by the good ship "War Temiskaming." This boat is named in honor of this district, by the Canadian Government, for setting a lead in the recent Victory loan campaign.

The "War Temiskaming" was launched at the Polson Iron Works Company's docks in Toronto on Saturday, Feb. 8. The honor of christening the boat fell to Mrs. R. S. Taylor, wife of the chairman of the Temiskaming district, and the well known hardware merchant.

Among those present were G. H. Wood, Chairman of the Ontario division, Geo. C. Wallace, organizer of Temiskaming, and F. Montye Macrae, organizer of the northern division.

Temiskaming subscriptions to the loan aggregated $7,000,000, of which $2,500,000 has been credited to Toronto, owing to the head offices of some of the mining companies being in that city. Temiskaming raised double its objective.

IRON ORE IN 1918.

Statistics and estimates of the United States production of iron ore in 1918, compiled under the direction of Ernest F. Burchard, of the U. S. Geological Survey, Department of the Interior, show a moderate decrease in output compared with the high records of 1916 and 1917.

EDITORIAL

AERIAL TRANSPORT IN MINING DISTRICTS.

There has naturally resulted from the great developments of recent years in aircraft many suggestions as to the utilization of the air for transportation. In Canada we are particularly interested, for this country has produced a very large number of capable flyers. Toronto is regarded as the greatest aircraft and flying centre on the continent. The Royal Air Force owes much of its success to the young Canadians who learned to fly in this country. We look to some of these men to become adventurers in the far north. Some will doubtless become leaders in transportation, furnishing facilities to mining men for reaching new districts that are at present difficult of access.

We venture to predict that it will not be many years before our great hinterland will be dotted with service stations for the accommodation of flyers who will carry men and supplies to out of the way places. Those who undertake the pioneer work in such an enterprise will encounter many difficulties, but like our older pioneers they will push on until success is won. That exploration will be much more rapid when air transportation is available is obvious. At present the explorer spends most of his time getting to and from the areas he wishes to explore. The flyer will take him there quickly and will come back later with supplies or to bring him home. Already something has been done in South America in this connection. In a paper presented at the New York meeting of the American Institute of Mining Engineers last week, Mr. George M. Dyott, of London, said:

"There are many who may consider a paper on aerial transport and its possibilities in connection with mining operations somewhat premature. Nevertheless, as there is considerable interest manifested in the subject at the present time and the amount of information available is both scanty and misleading, the result of investigations in some of the remote mining districts of Peru will not only be of interest, but will help crystallize, in the minds of many, a more correct conception of just what an airplane is capable of doing.

"By way of introduction, I will deal briefly with the types and varieties of airplanes now in use, and the developments of the past few years, pointing out how the war has encouraged machines of startling performance rather than those of commercial utility. I will then take up aerial transport in general, showing how airplanes may be employed to advantage and the particular kind of work for which they are best suited. This will cover a preliminary discussion on cost, which is one of the most important phases of the subject. In passing on from a general survey of the situation, I will deal with actual observations and investigations made in Peru. This part of the paper will be divided into two sections: the first, covering the mountainous districts of the Andes (Tamboras, Pataz, Soledad, etc.); the second, the alluvial deposits in the rivers, Chinchipe, Santiago, and Napo. In each case the question of atmospheric conditions, altitude, landing grounds, motors, cost, etc., will be discussed. While it is my intention to deal chiefly with mining in the sections mentioned, the same line of argument will be applicable to any other districts in the world. In conclusion, I will touch on the possibilities of using lighter-than-air craft of the Zeppelin type, followed by a summary of the most salient points brought out in the paper.

"In a general way the points emphasized will be: 1. That freight can be carried by means of airplanes. 2. That certain kinds of freight are more suitable for aerial transport than others. 3. That aerial transport will not compete with existing methods of transport, but will extend their sphere of usefulness. 4. That airplanes will prove a valuable adjunct to many mining operations. 5. That certain mines, which it is now impossible to open, can be put on sound lines of development by the intelligent use of air craft. 6. That many gold-dredging operations can benefit by the employment of flying boats or hydro-airplanes."

MINING LAW.

One of the most interesting discussions at the meeting of the American Institute of Mining Engineers in New York last week was that on mining law. The speakers did not stay very close to the text, "a uniform mining law for North America," but they presented many views and told of conditions in many mining districts. This information will make a good introduction for the discussion which is to take place at the meeting of the Canadian Mining Institute in Montreal next week.

It was made clear by the speakers that the great variety in mining laws is unfortunate, but likely to continue. By many the mining laws with which they were most familiar were considered fairly satisfactory, the chief objection of some to the differences seems to be the necessity of learning new laws for each district. Some prefer freehold to leasehold. Some prefer leasehold. Some regard freehold and leasehold as distinctly different and would estimate the freehold title to a mining property to be of much greater value than a

leasehold. Others contend that the leases as granted in Canada are in effect the same as freehold, being for twenty-one years and renewable.

The inclusion of the provision for discovery of "valuable mineral in place," in the requirements for staking of claims, received some attention. It was pointed out that in some cases it is impossible to make such discovery at the surface and that a very large expenditure for exploratory work is sometimes necessary. In such cases the prospector has no protection from others who might wish to unfairly take advantage of his work.

As pointed out by Mr. Gibson and Mr. Godson, the requirement that "valuable mineral in place" must be discovered before a claim is recorded, is a feature of the Ontario mining act that is not taken seriously. In the early days of the Cobalt silver boom it was found advisable to insist on such discovery. It was in an endeavor to do so that inspectors of mining claims were appointed. These men visited the claims and if they reported "no discovery," the claim was refused. There is naturally considerable difference of opinion concerning the possibilities of any mineral deposit and the system of inspection soon fell into disfavor. Inspection is not now carried on in Ontario, but the law remains unchanged.

In the discussion at the New York meeting there seemed to be general approval of the suggestion that the prospector should be allowed to judge for himself whether his claim was worth doing work on or not. It was admitted that the discovery of "valuable mineral" should be required; but that there should be no undue haste or confidence in concluding that any mineral discovery was not valuable. "Give the prospector the benefit of the doubt," says Mr. Winchell. No man can with the certainty that he is right say that a deposit should not receive attention. He may properly advise against expenditure of time and labor when the chances seem very slim; but, on the other hand, he should not be put in a position where he would prevent the willing prospector from working when he wants to do so.

The mineral rights in the public domain in the United States are controlled by the Federal Government. The States have little to do with mining law so far as alienation of property is concerned. In Canada, however, most of the provinces have control of their own natural resources and there are almost as many varieties of mining laws as there are mineral producing provinces. The differences are, however, not so great but that they might be removed. It would certainly be an advantage to prospectors to have a uniform law. It will not be easy, however, to determine what laws are most suitable. If the Canadian Mining Institute can do something with this problem it will help the industry by helping the prospectors.

CANADIAN DAY AT THE A. I. M. MEETING.

Tuesday, February 18, was Canadian Mining Institute day at the New York meeting of the American Institute of Mining Engineers. At all the annual meetings there have been present members from Canada, but for this meeting all members of the Canadian Mining Institute were invited. The Directors of the American Institute of Mining and Metallurgical Engineers, as it is now known, entertained the officers of the Canadian Mining Institute at luncheon. The day was spent in discussions on topics of mutual interest, several Canadians taking a leading part. At the meeting in Montreal next week the Americans will be the guests of the Canadian Mining Institute. The discussions started in New York will be continued at Montreal. Incidentally Americans and Canadians will become better acquainted. We are pleased with this new expression of the good feeling between the mining men of the two countries.

THE SILVER MINES.

With bi-metalism once more being seriously discussed by leading metal authorities, and with apparently at least fair prospects of some such development taking place before very long, the mines of Cobalt find themselves occupying a position of perhaps greater advantage than any other silver producing mines in the world. Some of the heaviest producers of silver in the United States are operated chiefly for the copper they contain, the white metal being but a by-product, whereas the mines in Cobalt are operated entirely for the high grade deposits of native silver which they contain. It is an interesting fact that many low grade silver mines in other countries were compelled to close down during the war, while in Cobalt great prosperity has been experienced during the period of greatest strain. The high grade nature of the deposits made this possible. According to local opinion, it is small wonder, therefore, that metal authorities in other countries are becoming alarmed over the great decline in silver production from their low grade mines, and small wonder that the mines of Cobalt should be operated unremittingly and at the fullest possible capacity. In view of this favorable state of affairs as far as Northern Ontario is concerned it seems reasonable to anticipate increasing activity in the Gowganda field also, as well as in the Elk Lake and the South Lorrain areas, and in the vicinity of the CaseyCobalt mine in the township of Casey.

The moving of the recording office from The Pas to Dauphin, Manitoba, has not yet been satisfactorily explained. To us it seems absurd. The Minister of the Interior will do well to reconsider the matter, or to at least give his reasons for making the change.

President Timmins' Report to Hollinger Shareholders

In the report to the shareholders of Hollinger Consolidated Gold Mines, Limited, for the year ending Dec. 31, 1918, President Timmins says:

The balance carried forward is $2,071,287. The tonnage milled was 578,755, from which $5,752,370 was recovered. Other income makes a grand total of $5,908,327. Working expenses absorbed $2,857,510, and depreciation, taxes and donations $462,254, leaving a net profit of $2,588,563, out of which dividends amounting to $1,230,000 were paid and $1,358,563 added to the surplus. The company's cash position has been greatly improved by the purchase of $1,575,000 of Victory Bonds, thus making our total holding of high grade Government and Municipal securities $1,687,717. I am confident the shareholders will approve of the policy of building up such a strong reserve as will be commensurate with the great destiny of the mine and the magnitude of its future operations.

The labor situation already shows signs of improvement, and we dare to express the hope that with the return from overseas of a number of our old employees, and as the country changes more and more from a war to a peace basis, we will be able to speedily secure our full share of skilled and stable men with whom we will earnestly endeavor to establish relations of co-operation and mutual good will. The mine is in such shape that we are able to employ a large number of additional men at good wages, which also brings up the problem of increased housing accommodation, plans for which are now under consideration.

The resumption of the payment of dividends during the year was a matter of special gratification to the directors, and we expect, in the absence of any unforeseen or unexpected contingency, to be able to continue the dividends at the same rate until the general mining situation and the financial position of the company warrant an increase. It is, however, impossible to be more definite in regard to the question of dividends as so much depends upon conditions beyond our control. Shareholders will be kept informed of the position of the company by interim reports which will be mailed to them from time to time.

A matter worthy of mention is the fact that we have completed arrangements to send our bullion to the Mint at Ottawa to be refined. Heretofore bullion shipments have been made to the United States Assay Office, New York City, the company receiving payment in New York funds, thus enabling it to make a very substantial profit by the sale of exchange. However, recent improvements at the Ottawa Mint make it possible for it to treat all our gold bullion, so that, in order to do our part in building up the gold reserves of Canada, and acting in co-operation with the Minister of Finance, we have decided to send our bullion to Ottawa, receiving payment in New York exchange.

During the year certain necessary extensions and additions to the plant, which have been deferred owing to war conditions, will be proceeded with. This will involve the completion of the mill, the installation of an extra compressor, the erection of a refinery and other buildings.

As is already known to our shareholders, Mr. P. A. Robbins, who has been our General Manager since the year 1911, retired from office some months ago. Mr. Robbins had long contemplated taking an active part in the war, and when the United States, his native country, entered the struggle, the call for service became so insistent that he decided to give up the position with this company which he had so long and ably filled, and volunteer for service overseas. Our new General Manager, Mr. A. F. Brigham, came to us from South Africa, where he was Manager of the great Jagersfontein Diamond Mines. The company is to be congratulated upon having been able to secure the services as General Manager of such an eminent mining engineer and experienced company manager.

The directors sincerely regret to record the death on the 12th of April last of their friend and colleague, Mr. John McMartin, M.P., Vice-President of the company since its inception. His broad interest in all the affairs of the company and his sound judgment have been greatly missed at our councils. The vacancy on the Board created by Mr. McMartin's death was filled by the election of Dr. Wilfred L. McDougald, of Montreal, Mr. D. A. Dunlap becoming Vice-President.

We have a devoted and competent staff who have carried out their duties with conspicuous ability during another difficult and trying year.

UNEXPECTED LACK OF DEMAND FOR POTASH.

The present is a critical time for the potash industry recently established in the United States, according to H. S. Gale, of the U. S. Geological Survey, Department of the Interior. Prior to the war this country used more than a million tons (gross weight) of potash salts each year, and it has been supposed that the cutting off of a large part of this supply was a keen deprivation, particularly to the farmer, by whom it was used for fertilizer. This foreign supply has not been available during the war, and with much energy and enthusiasm a domestic production equivalent to about one-fourth the former importation has been built up. Now, however, it is unexpectedly disclosed that there is little or no market for potash either at the high prices that have prevailed or even at a considerably lower price. No satisfactory explanation of this situation seems to be offered.

Approximately 100,000 tons (gross weight) of potash salts, produced in Nebraska in 1918, are reported as lying in storage warehouses, distributed throughout the southeastern States, which is in the region where potash is principally consumed. This is of the same quality that was used in 1917, and is immediately available to the fertilizer manufacturer or the farmer. Potash of other sorts from various sources is also reported unsold, though in smaller quantities. As this surplus represents approximately half the relatively small domestic production, and as potash from foreign sources has not been available during the year, it is difficult to explain this apparent lack of interest in the present small domestic supply.

California capitalists are said to have taken an option on the Silver Nugget Group of Claims, situated near Silverton, B.C. The property carries high silver values.

Mining Convention in Vancouver March 17-19.

Vancouver, Feb. 19.

Vancouver is the logical centre for the mining industry of British Columbia and that is one of the things that the committee in charge of the International Mining Convention to be held in the Terminal City on March 17, 18 and 19, is aiming at. By many, Spokane has been looked upon as the headquarters of many of the mining properties in B. C. The Chamber of Mines holds that this condition of affairs is not as it should be, that Vancouver geographically has a prior claim to that position and at the convention steps will be taken to see to it that the commercial capital of British Columbia is accorded the honor to which it is entitled from every point of view.

The mining men throughout the province are keen in support of that claim. Already communications have been received from them notifying the Chamber of Mines—whose name by the way has been altered to the British Columbia Chamber of Mines—that no stone will be left unturned to make the convention an unqualified success. Already a number of delegations have been appointed. The East Kootenay mines and business men will send a big representation to Vancouver. Prince George is taking an interest and the Hazelton district does not intend to be left behind. Kamloops, Vernon, Qeslo, Princeton, Prince Rupert and in fact every important centre in British Columbia expected to be represented.

The change of name of the Chamber was brought about a few days ago and is subject to confirmation. The idea is to make the Chamber more representative not only in name but also in membership. With the last named and in view of the arrangements for the sending of someone into the interior to get together a thoroughly representative committee to take charge of the local delegations are well forward. The committee are aiming at expansion and development along lines that have hitherto not been attempted before and while this will not be in the proper sense a membership campaign, that factor will not be overlooked.

Everything in connection with the convention is proceeding satisfactorily. There is no doubt that it will be a premier gathering in point of importance and attendance not to mention the questions that will be considered. The mining of gold, silver, copper, iron, platinum and coal; the smelting of ores; taxation of companies and many other matters will be brought forward for discussion. It is a big meeting that mining men have been advocating for many years and if the efforts of Mr. J. D. Kearns, the general manager of the convention and those associated with him are to be taken as a criterion, the convention is already an assured success.

In the sixty-five years that there has been mining activity in British Columbia, over half a billion dollars have been taken out of the earth and yet the province has only been scratched. To-day there are greater indications of activity than ever before. The demand for the various metals which are indigenous to British Columbia in the form of ores, is more insistent than at any time in the history of British Columbia, and for that reason if for no other, it is up to the business men of the province and to those whose interest in the industry is comparatively small or nothing at all, to take every step that will eventually assist in putting British Columbia on the map as the premier wealth-producing district of North America.

The convention next month is a means towards that desired end. Strong co-operation and a pull altogether by every section of the province and the result will exceed the greatest expectations of the promoters. This district is being asked to do its share of the work in helping to make the convention a record-breaker and the convention committee have every hope that it will be so.

The exhibition of ores and machinery is to be held in the basement of the Vancouver block and the convention will take place in the Hotel Vancouver where the headquarters will be.

INDUSTRIAL GAS MASKS.

The U. S. Bureau of Mines announces that it is making a preliminary investigation of gas masks with a view to establishing a list of approved devices for use in the mining and allied industries. After the preliminary investigation the Bureau will issue a schedule of tests which apparatus must meet in order to gain the approval of the Bureau of Mines. These investigations will be conducted at the Bureau's Pittsburgh Station by men who have had intimate connection with the development of mine rescue apparatus and gas masks used in warfare.

ASKING FOR BOUNTY ON IRON ORE.

Sir Thomas White, Acting Premier of Canada, was asked by a delegation representative of the Port Arthur, Sudbury, and North Bay Districts of Ontario, which waited upon the Dominion Government early in February, to grant a bounty of at least 50 cents a ton on all iron ore "mined and smelted in Canada," during the next fifteen years. The Acting Prime Minister assured the delegates that the representations made would have the consideration of the Government before the annual financial budget is presented to Parliament, when fiscal changes will be announced. He expressed the appreciation of the Government of the value of the large deposits of iron ore in New Ontario, and the good that would result to the country from their proper development. That the Canadian West is behind this movement for Federal support to the iron and steel industry is indicated by a wire forwarded by Hon. Wm. Sloan, Minister of Mines for British Columbia, to the Board of Trade of Port Arthur, Ont., giving it its hearty endorsation on behalf of the Provincial Government.

During the month of January the Nipissing Mine produced $227,936. A short interruption occurred during the early days of the month, at which time the annual clean-up was being made, as well as certain necessary alterations to the equipment.

Mining interests of the Kirkland Lake district are making an appeal to the Ontario government with a view toward having a branch line of the T. & N. O. Ry., constructed from Swastika to the heart of the camp, a distance of about six miles.

Campbell & Deyell Discontinue Ore Sampling

The firm of Campbell & Deyell, which has this week announced its intention to discontinue its ore sampling business in Cobalt, has been doing business there since June, 1909. During the ten years of operation the firm's plant has always constituted an adequate and independent system of ore sampling. Ore containing approximately 61,000,000 ounces of silver represents the actual amount upon which the firm has been entrusted to place valuation.

To illustrate the responsibility devolving upon such an enterprise, and the position of trust in which it must of necessity be placed, it would perhaps be well to point out that all Canadian smelters and certain of the smelters in the United States accept the valuation of the ore made here, as a basis of purchase. The business of the firm has been primarily that of ore-sampling and assaying, and with its present equipment it has been able to deal with the following varieties of work:—

(1)—The sampling, grading and valuation of ore shipments in transit between mine and smelter; the result of the sampling, or sampling and valuation, serving as a basis of settlement between smelter and mine.

(2)—The sampling and assaying of large or small lots of ore to ascertain the value of its contents in gold, silver or other elements.

(3)—The assaying of samples from mines and concentrators. Also of samples sent in by engineers, prospectors and general mining interests .

(4)—Umpire Analyses—A considerable portion of this and other work is received from a distance; samples being sent in by mail and express from all parts of the country.

General regret is expressed in the north over the intention of the firm to discontinue its ore sampling business. Not a few mines will suffer inconvenience thereby. It will make it impossible to personally supervise the sampling of ore locally, and necessitate frequent journeys to down-country smelters by representatives of a large percentage of the mines. Heretofore it has been possible to have the sampling of ore done subject to inspection at all times; and following the completion of the sampling, a valuation placed on the ore, such valuation being acceptable to the smelters, and the producer knowing exactly the value of his shipment long before such has been treated.

In making any bargain it is necessary for the parties thereto to know two things, in order that the transaction may be carried on efficiently; the exact nature of the articles to be sold, and the exact requirements of the prospective purchaser. Primarily it is required of a mining company to know definitely the nature of the ore which it has to market. Secondarily it must know the requirements of the various smelters in order that each grade of product may be marketed to the best advantage. This, of course, necessitates a careful sampling of each shipment before it is marketed and a business-like handling of each lot of ore according to results obtained.

It has been the aim of the firm of Campbell and Deyell to fill the requirements annotated above. The figures which show a valuation placed on ore sampled at 61,000,000 ounces, in addition to the fact that silver metallics melted and cast into ingots in the firm's bullion department amounts to approximately 1,200,000, testifies to the measure of success which the firm has attained in its endeavor to fill the requirements above mentioned.

B. C. COAL PRODUCTION.

The total amount of coal produced by the collieries of Vancouver Island for the month of January, 1919, was 158,327 tons. This is 18,040 tons more than was produced during December, 1918, and 55,632 tons more than was produced during December, 1917, and 55,-632 tons more than the production of November, 1918. The total of 158,327 tons only lacks 2,831 tons of being equal to what was produced by all the coal mines of the Province in November, 1918, and is 10,000 tons in excess of the largest production in the history of the Vancouver Island Collieries.

The tonnage produced by the various collieries are as follows:

	Tons.
Canadian Western Fuel Co., Nanaimo Colliery	64,404
Canadian Collieries (D) Ltd., Cumberland Colliery	51,666
Canadian Collieries (D) Ltd., Extension Colliery	21,217
Canadian Collieries (D) Ltd., South Wellington Colliery	7,813
Pacific Coast Coal Mines, Ltd., Morden Colliery	4,541
British Columbia Coal Mining Company, East Wellington Colliery	3,543
Nanoose Collieries, Limited, Grant Colliery.	2,697
Granby Consolidated M. S. & P. Company, Granby No. 1 Colliery	2,446
	158.327

The Canadian Collieries (D) Ltd., leads in production with a total of 80,696 tons from their different collieries, with the Canadian Western Fuel Company second with a production of 64,404 tons from their Nanaimo Colliery.

The new No. 5 Mine opened by the Canadian Collieries (D) Ltd., at South Wellington, has an output of 7,813 tons for January. The Granby Company's new mine at Cassidy, V.I., produced 2.446. Both of these mines should now rapidly increase their production.

The Canadian Western Fuel Company's new Wakesiah Mine is now nearing the time when it will become an active producer which should augment that company's tonnage in the near future. Both shafts are now down to coal and connected, and arrangements are under way laying out the shaft bottom arrangements.

These three new mines should give a good account of themselves during 1919, and considerably increase the tonnage produced from the Vancouver Island Mines.

It is stated that returns from the recent shipment of ore from the Foster Mine which is being operated under lease, shows a production of about $80.000 from the high grade ore shoot opened up during the closing months of 1918.

Lower Prices Necessitate Lower Wages to Copper Miners

Production of copper is the most important phase of the British Columbia mining industry. It is so both in respect of the value of output and the number of men employed. The present uncertain conditions in regard to market has led in this Province, as elsewhere, to an unsettled state of affairs as to the immediate future of the industry. But the prospects are not as gloomy as the bare statement of the condition would imply. The managements of the several large mining corporations most affected are facing the problem before them courageously. They have adopted the policy of taking the men into their confidence, clearly stating to them that refusal to accept lower wages means cessation of operations, at least until the re-establishment of a more normal market, and placing on their shoulders to some extent the responsibility of decision.

Reference was made recently to the action of the management of the Consolidated Mining & Smelting Co. of Canada in calling in representatives of their employees, of the explanations that followed as to outlook in regard to the metal trade, and to the statement of the former that, with co-operation from the men, it was the company's confident belief that it would be possible to "carry on" until the market became steady. The condition at Trail, B.C., as a result, is reported to be satisfactory. The strength of the smeltery staff is being maintained with little fluctuation and new work, planned to place the company in a position to handle the business looked for with the commencement of re-construction, is making good progress.

In these days of social unrest, with the virus of so-called Bolshevikism rampant, it is refreshing to find that the same spirit of co-operation is evident among the employees of the Granby Consolidated Mining & Smelting Company at Grand Forks, where the men working at the smelter have agreed to continue at a wage based on the Butte scale. This means that their pay will be governed by the price of copper when a market is available. At Anyox, B.C., the chief industrial centre of the Granby Company, the attitude of the men is not yet definitely known. It is thought, however, that they are likely to adopt the same reasonable view as their fellows of Grand Forks. If this proves so the operations of the company may not be seriously affected. The interruption to an important industry, with its attendant loss of time and money both to employer and employee, may be avoided. At any rate the company has given expression to its desire to do its utmost to keep the wheels moving, and should a sympathetic response be forthcoming from the workers, British Columbia will not suffer as are some of the large copper producing sections of the United States.

The Britannia Mining & Smelting Company, another very large producer, is meeting the situation by rather a different method; but by one which, in the last analysis, works out about the same. Men are being discharged, and no doubt the company's operations will be curtailed in a considerable degree. However, when the men are laid off they are given the option of returning to their jobs at a reduced scale. Many are accepting the proposition. Thus there is no reason for a competent man to be idle. There is work, useful and profitable work to be done, and those with a proper appreciation of the world condition as to metals, and particularly as to copper, are continuing that work.

There is no doubt that the relationship between manager and worker is changing, and very radically, too. It is evident in what has been said as to the position in this Province. Those companies which have treated the representatives of the men as intelligent persons, which have taken the trouble to point out that with no income it is impossible to pay high wages and to explain how it happens that there is no income at present, for the most part find their men standing behind them. And it may well prove that the recognition of the wisdom of such a policy by the companies will lead to the maintenance, notwithstanding existing difficulties, of an industry that means much to the welfare of British Columbia.

THE DOLLY VARDEN AND WOLF PROPERTIES PURCHASED BY TEMISKAMING MINING COMPANY.

Mine operators and prospectors interested in the Alice Arm District, British Columbia, as well as the Provincial Mining Fraternity generally evince keen interest and much gratification in reading a recent Toronto, Ont., press despatch regarding ownership of the Dolly Varden Mine, which reads as follows:

"The shareholders of the Temiskaming Mining Company at their annual meeting yesterday(February 4), consented to the proposal of the directors to extend the operations of the company by taking over the Dolly Varden and Wolf Silver Mines in British Columbia. These mines have been handicapped for some time owing to lack of finances, and the Temiskaming Company has entered into an agreement whereby operations will be resumed. The purchase price of the properties is $900,000, but the obligation to the former holders of the mines is only $450,000 because of the liabilities the Temiskaming Company has to assume."

The railroad from the beach at Alice Arm to the Dolly Varden mine was practically rebuilt and nearing completion when the construction company went into liquidation with the result that most of the mining properties and prospects of the district were tied up. Hopes were entertained, however, that an early adjustment of the railroad difficulties would be arranged and negotiations to that end were entered into.

The Dolly Varden Mines Company owns the Dolly Varden property, which is situated about eighteen miles from tidewater on the west bank of the Kitsault River, and the Wolf property, two miles farther up on the east bank of the Kitsault. The Dolly Varden has been extensively opened up by underground development, and is therefore in condition to start shipping at any time. The orebodies have been proven by thousands of feet of diamond drilling.

On the Wolf property a tunnel thirty-five feet long has been driven in on the ore body, from the face of which a cross-cut to the north fifty feet and to the south ten feet proves the ore body for a width of sixty feet, with neither wall in sight. Several thousand feet of diamond drilling has been done proving the orebody and showing it to be of good milling grade.

The Sullivan Mine

One of the few really big metalliferous mines of British Columbia is the Sullivan, owned by the Consolidated Mining & Smelting Company of British Columbia. Part of the programme of the company's work for 1919 is the extensive development of this property. It has been turning out a large proportion of the silver-lead-zinc ores handled at the Trail Smeltery for some years, but it is proposed, evidently, that its resources shall be exploited to a greater extent and the plans referred to are to be carried out with that end in view. The economic wisdom of this has been emphasized by the reported recent establishment of a feasible metallurgical method of so treating the rather refractory ores of the Sullivan as to secure a fuller return of their content, particular as to lead and zinc.

The importance of the Sullivan mine to the mining industry of British Columbia has long been recognized by the mining men of the Province; but it is doubtful whether its possibilities have been properly appreciated outside that circle. When Mr. Wm. Fleet Robertson, Provincial Mineralogist, first examined the property, then a prospect, he pronounced it the greatest ore deposit he had had the pleasure of inspecting in British Columbia up to that date. He ventured the opinion that, in the hands of men or a corporation with ample capital, it would prove a value asset. Time has fully justified the position he took, but it is questionable whether he, or those who afterwards undertook its development, expected that it would do as well as now promises.

The foregoing has been prompted to an extent by the reading of an article which has been published in the Fernie (B. C.) District Ledge describing the present work at the Sullivan mine and giving some figures relative to its ore reserves. While the latter are large and are uttered a trifle too glibly, it being questionable whether any authority would, at the present stage, care to attempt to say just how many million tons of ore are available, the observations as to general conditions may be accepted and those of a statistical nature may prove, in the course of time, to be justified.

The article reads:

"From all appearances the town of Kimberley, situated eighteen miles north of Cranbrook (B. C.), is due for a boom of great importance. The Consolidated Mining & Smelting Co. of Canada has just completed work on the main tunnel at the Sullivan mine. This tunnel is over two miles long, and will accommodate two standard tracks. It is said to be the longest and best built of any in the world. The cost of this undertaking alone approximates four million dollars. The latest electrical mining machinery was used on the tunnel with a modern equipment of a overhead dump system. The Sullivan group of mines is the richest silver-lead proposition in the world to-day. It is estimated that taking out three hundred tons a day the company has enough ore in sight to last it for one thousand years. At present the company has about 400 men in its employ.

"Contracts will be let at once, it is said, for one hundred modern cottages, which will be erected on the hillside.

"Preparations also are under way for the erection of new buildings to treat the increased output of ore which will be developed as soon as the 800 ft. raise is completed. About twenty cars a day are anticipated.

"By next spring the company expects to employ in the neighborhood of one thousand men, it is stated.

"The Kimberley Miners' Union, it is rumored, has in contemplation the erection of a modern building, which will be utilized both for a place of meeting and recreation purposes. Billiard and pool rooms will be included in the equipment.

"The establishment of a motion picture house, with modern equipment, will also be a part of the Kimberley Progressive Movement.

"The only drawback at the present time is the lack of sufficient water power. There is an abundance of water in St. Mary's River, but sufficient drop cannot be had to enable the generating of power. It is very probable that the Bull River Power Company, in which enterprise the mining company is interested, and on which a large sum of money already has been spent, will be rushed to completion and put into operation at once. With this the rumor of the electrification of the Crow's Nest Pass Railway, and the supplying of power to towns along the Crow, including Fernie and Cranbrook, again is revived."

Dolly Varden Railway.

Victoria, B.C.—The British Columbia Legislature has before it a petition relative to the eighteen mile railway which has been constructed from Alice Arm, B.C., practically to the Dolly Varden mine, which is of special interest in view of the recent announcement that the Temiskaming Mining Company has secured possession of the Dolly Varden and Wolf Silver mines. The petition sets out that the Taylor Engineering Company spent $425,000 on the railway, almost completing it, without being repaid by the owners of the Dolly Varden. It is detailed that the Dolly Varden company was incorporated in 1917 by private bill and that subsequently arrangements were made with the Taylor Engineering Company for its construction. The latter, it is said, received nothing more substantial than promises to pay. Negotiations having been entered into by the Dolly Varden Corporation for the sale both of mines and railway, the contracting company, which since has gone into liquidation, although assured that its interests would be protected, began to manifest some concern, it being alleged that there appeared to be a disposition to attempt to evade responsibility. The petition is an effort to obtain legislative protection for the assets of the railroad builders as represented by the road to which they were unable to give the finishing touches.

Silver Creek Mines, Ltd.

D. Woolsey, managing director of the Silver Creek Mines, Ltd., owners of the Woolsey group of mines near Revelstoke, B. C., was in the Province recently and is confident that the work now in progress will result in the blocking out of a large tonnage of good ore. With good trails for transportation and all necessary equipment present operations will be continued all winter and in the spring it is the intention to complete the construction of a road which was commenced last year. A tunnel has been driven eight feet under the vein and a cross cut is to be started immediately.

Special Correspondence

NORTHERN ONTARIO.

Another New Vein at Crown Reserve.

A second vein which gives promise of being of considerable importance has been cut recently at the 200-ft. level of the Crown Reserve property, at Cobalt. As yet, insufficient work has been performed on this new discovery to definitely gauge its value. A shipment of high grade ore is almost ready to go forward from the vein discovered at this level in the eastern section of the property during the closing month of the last year. Considerable talk is prevalent regarding the likelihood of an early dividend being paid by Crown Reserve, but the oficials of the company are reticent regarding the matter.

Deeping Shaft of Reliance Property.

The shaft on the Reliance property in the southern section of the Cobalt camp has been continued from the 50-ft. level to the 100-ft., and a substantial quantity of ore is being mined. The property is under lease to John Shaw, formerly manager of the Hargraves, and Edward Dean. A force of about ten men are engaged. During the past month the operation has resulted in considerable profit to the leaseholders.

Diamond Drilling Property in Casey Township.

English interests are engaged in diamond drilling a property situated in the immediate vicinity of the Casey-Cobalt mine, in the township of Casey, about nine miles northeast of New Liskeard. Rock formation, which is covered with a heavy overburden, is said to closely resemble that occurring on the Casey-Cobalt, and considerable interest attaches to the undertaking, owing to the long and favorable career of production at the Casey.

Matachewan.

The advent of spring is expected to be accompanied with renewed activity in the Fort Matachewan district. Considerable work is being planned by property owners. Concerning the plans of the Matachewan Gold Mines, which is the leading operation of the district to date, nothing definite has been heard for some time. Late in the fall a four million dollar company was organized for the operation of this property, after a large amount of diamond drilling had been done, which was said to have given satisfactory encouragement for the installation of equipment to mine the property to a considerable depth. A large amount of assessment work falls due in the district during the spring and summer months.

Nickel from Alexo Mine.

During the first week in February the Alexo Mine at Porquis Junction shipped four cars containing approximately 400,000 pounds of nickel ore. The output for the first week of the current month was the highest for some time, and compares with three cars containing 320,000 lbs. during the last week of January. The ore from this mine is shipped direct to the smelter at Coniston.

Miller-Independence will be big Producer.

The announcement of the intention to sink the main shaft of the Miller-Independence mine at Boston Creek to a depth of 500-ft. with lateral work at each one hundred foot level, puts the leading operation of the Boston Creek area in a new light. A substantial tonnage of ore in the neighborhood of $1,000 per ton in value is now in sight, with the indication that these values will prove consistent. In addition to this extremely rich ore, a large quantity of ore which has been generally termed as "high grade" has been opened up. Plans are being made for the installation of a mill and roasting plant of a capacity of 100-tons daily at the property, and it is estimated that an average mill head of between forty and fifty dollars per ton can be maintained at the mine without drawing too extensively on the richest of the ore. It is thus anticipated that the average daily output will be in the neighborhood of $5,000. This would bring the monthly production in the neighborhood of $150,000, or about $1,800,000 yearly. It is calculated the costs of treatment and mining will run about twelve dollars per ton, thus leaving a net profit of not far under $1,400,000 annually, which is equal to about 200 per cent on the company's issued capital of 700,000 shares.

The annual meeting of the company was held at Dayton, Ohio, on February 6th, when the following directors were elected: George J. Miller, John C. Schaeffer, G. W. Ozias, Ed. Rettich, Judge Brown and Frank Groch. The only change in the directorate was the election of the last named gentleman to fill the vacancy caused by the resignation of Mr. Kirkpatrick.

Drilling Cotter Property.

At a depth of about 600-ft. on the Cotter property in the Boston Creek Gold area, the eastern continuation of the rich vein of the Miller-Independence Mines has been cut by diamond drilling. The core of the drill shows splashes of gold, and the assays are high. It is therefore expected that other large operations will soon be under way in the district, as the potential value of any property over which this rich gold deposit passes would appear to be great. The encountering of the vein with high gold values obtaining at this depth of the Cotter property, proves the consistency of the deposit, and adds greatly to the future prospects of the district in general. A large amount of new work has been planned for other properties in the Boston Creek district, and the coming spring and summer gives promise of being the most active for the area since the discovery of gold there. It's easy access to the railway, which passes through the township, coupled with available electric energy, gives promise of rapid expansion, and it is expected the gold production of the province will be materially added to during the current year by the results of production from this comparatively new field.

Patricia.

Arrangements are being made for a resumption of operations at the Patricia property early in March. The Patricia was closed down last fall due to difficulty in securing sufficient fuel with which to provide energy for the steam plant which has been installed, including a small mill. The future plans of operation are said to include the sinking of the shaft to deeper levels with stations at each succeeding 100-ft. The orebody on the property has already been proved to a depth of two hundred feet.

On the adjoining property (the O'Donald) a diamond drilling campaign is being carried out. Favorable developments met with on the various properties in the immediate vicinity will at the same time enlarge the possibilities of the Patricia, as the general strike of the veins is such that those encountered

on the O'Donald will probably be found to continue on to the Patricia.

With the low lying ground solidly frozen it should now be possible to secure ample wood for the requirements of the steam plant which the company intend using until early in the summer, when electrically driven machinery will be installed.

Lake Shore.

With earnings exceeding dividend requirements at the Lake Shore property in Kirkland Lake, it is expected in well informed circles that another dividend will be forthcoming in the very near future. During 1918 the company paid two dividends of 2½ per cent each, amounting to a total of $100,000. The next dividend is expected to be for a like amount and will call for the distribution of $50,000. With the output exceeding the dividend requirements, rumors are current that a 3 per cent quarterly dividend will be paid from this time forward. However, the conservative attitude of the directors leads to the belief that the present rate of dividends are likely to continue, with the possibility of a bonus being paid at intervals when convenient.

The Hollinger Report.

The eighth annual report of the Hollinger-Consolidated Mines, Limited, of Porcupine, gives many interesting facts concerning operations at this big gold mine during the past year. While the report states that very little development work has been done, in the ordinary course of mining during the year, nearly five miles of underground work was done, consisting of sinking, drifting, crosscutting and raising. Almost two miles of diamond drilling was also done at the property. Another extremely important fact is that some forty veins known to occur on the surface, ranging in width from 3ft. to 25ft., and containing average gold values of $9.86 per ton, have not as yet been developed underground, and remain to swell the already huge ore reserves of the mine, which are now estimated at upwards of forty-one million dollars. The following is a concise summary of the performance of the company for the past year:

Total tons treated	578,755
Total recovery	$5,752,370.87
Other income	$ 155,957.00
Total income	$5,908,327.87
Average recovery per ton...	$ 9.94
Costs of operation	$2,857,510.22
Depreciation, taxes, donations	$ 462,354.54
Total cost	$3,319,764.86
Operating cost per ton	$ 4.94
Cost per ton including depreciation	$ 5.73

Another important fact is that the average gold content in the ore reserves of 4,489,080 tons is $9.15 per ton, as compared with an average of $8.95 per ton in the $4,494,510 tons, estimated at the end of 1917. This increase of 20 cents per ton in the grade of ore adds $897,816.00 to the value of the tonnage estimated, and makes possible the addition to the value of the ore reserves of $848,570, which otherwise would have shown a decline of 5,430 tons.

The report of the company is highly satisfactory and demonstrates the strong physical as well as financial condition of the company.

With reference to the existing conditions of labor during the past year the report says: "The disabilities under which the gold mining industry has been carried on owing to the transitory habits and shortage of miners, obtained its maximum when, in November, the number of men engaged underground reached the low figure of 482, as compared with 849, the highest. We had for competitors the silver, nickel, copper and gold mines, which could advance wages easily as the price of their product increased. We, on the other hand, soon got to our limit, as the price of gold did not move. Now, however, with peace assured, all are thankfully and hopefully looking to the future for a return to more normal conditions when the slow process of readjustment is completed."

Dome Lake.

The annual report of the Dome Lake Mining and Milling Company of Porcupine, soon to be mailed to the shareholders, covering operations of the company during the year 1918, will show a total production of upwards of $115,000. In the neighborhood of 12,000 tons of ore was treated, an average of $9.65 per ton being recovered. Costs of production are said to have been $8.27 per ton, which leaves a profit of about $1.38 per ton, or a total profit of between $16,000 and $17,000 for the year. The installation of the cyanide system of ore treatment, which was completed in March last, has resulted in better recovery, the average being about 90 per cent. The outlook for the future is said to show a decided improvement, a better grade of ore being developed at depth. Late reports from the Porcupine district are to the effect that operations at the property are being speeded up considerably, the working forces being added to. It is also reported that an important ore body has been encountered in a raise from the 500-ft. to the 300-ft. level of the property.

Dome to Resume.

Reports just received from Porcupine state that arrangements are being made for the re-opening of the Dome Mines Mill early in the spring. In the meantime additional mine workers are being taken on and underground work is being speeded up daily. It is stated General Manager Keading, who is now in California, plans to return to the mine about the first week in April, and will proceed with immediate preparations for the re-opening of the mill. The enormous amount of underground work done during the past year or so, together with the large tonnage of ore broken in the mine waiting to be conveyed to the mill, assures ample tonnage for the operation of the milling plant at capacity, which is about forty thousand tons per month. Mining and hoisting facilities have been brought up to a high degree of perfection, all of which is expected to help in re-establishing the low operating cost of around $2.60 per ton, for which the Dome was noted before the strain of war was felt. By next mid-summer production should be up to normal and before fall the output might reasonably be expected to exceed all past records. A large ore crusher has been installed at the 800-ft. level, which it is expected will greatly facilitate the handling of the ore. According to the last annual statement of the company ore reserves, which were all estimated above the 700-foot level of the property were close to $10,000,000. With ample labor promised in the near future, the outlook for the Dome exceeding its past enviable record during the current year appears bright.

Tough-Oakes.

At the special and annual meetings of the Tough-Oakes Mines in Toronto on Wednesday of last week, by-laws were authorized for the transfer of the head office of the company from Haileybury to Toronto, and also for the sale of treasury stock at a discount of not more than 55 per cent. This means the stock is not to sell at less than $2.25 per share. Some 78,500 shares of stock remains in the treasury. In reply to questions regarding the affairs of the former directorate and management of the mine, Mr. Harry Oakes, president of the company, said the present directors were not in a position to make any statement as to the present condition of the mine. Members of the former directorate of the company were conspicuous by their absence, none being on hand to explain any of the affairs of the company. The following directors were elected for the current year: Harry Oakes, Dr. R. J. Robins, J. B. Holden, J. Y. Murdock and A. Burt. The official information in the foregoing statements appears to indicate that the Foster control of the Tough-Oakes Mines has ended. It is expected a thorough examination of the mine will follow in the near future, which will provide the new control with the necessary information to intelligently undertake the task of placing the mine once more on a producing basis. Funds for the immediate commencement of this work are understood to be available, and these will be further augmented by the sale of treasury stock as indicated at the recent meeting.

Lake Shore.

For the first month of the company's new fiscal year (December), the Lake Shore Mines of Kirkland Lake produced $45,101 in gold, which slightly exceeds any previous month's output in the history of the mine. The tonnage for the month was slightly lower than the average for the past three months. The average value of the ore treated was $25.04 per ton. The mill ran 95 per cent. of the possible running time. The development work of the month consisted of the following:

200-ft. level.—Drift on No. 2 vein east advanced from 194 to 281 feet, producing milling ore of a good grade for the entire distance.

400-ft. level—The north drift on the No. 2 vein east advaced from 405 ft. to 429 ft., the south drift advanced from 405 to 425 feet.

On the No. 1 vein, west, the north drift was advanced from 332 ft. to 399 ft.

Milling—The mill ran 95 per cent. of the possible running time, producing $45,101.34 from the treatment of 1,801 tons of ore.

Annual Report of Lake Shore Co.

The annual report of the Lake Shore Mining Company, Limited, for the fiscal year ending Nov. 31st, 1918, has been issued. During the eight months and twenty-four days that the mill was operated 14,984 tons of ore was treated, from which a recovery of $24.76 per ton was made, the total production amounting to $370,128. The total cost of operations for the year amounted to $185,461, including $22,285 for depreciation of buildings and equipment and $5,000 for administration. From this is deducted $46,365 incurred during the first quarter before the completion of the mill, thus leaving a total cost of but $139,095, as against the total income of $374,073. The cost of production therefore average $9.30 per ton, including the amount allowed for depreciation. A profit of $234,978 is therefore shown. A commendable feature of the policy of the company is the making of "Provision for Exhaustion," for which the sum of $90,000 was put aside. Since the commencement of milling operations on March 8th last, two dividends have been paid, amounting to $100,000. Each dividend amounted to 2½ per cent., and called for the disbursement of $50,000.

15,175 tons of ore has been hoisted from the four levels of the mine, the 100, 200, 300 and 400 ft. levels. Approximately 80 per cent. of all drifting has been done on ore of milling grade. A large amount of construction work was completed during the year, including: Assay office, refinery chateau, ice house, teamster's cottage, stable and two bungalows. A mine office and storeroom are now under construction. During the summer months exploration work was conducted on other properties in the Kirkland Lake district with a view to benefiting the company and the camp in general.

Owing to the scarcity of labor the work was confined mainly to drifting on the veins, and only raises necessary to secure ventilation were put through, no work having been performed that would actually block out ore, consequently no attempt has been made to figure out ore reserves. The favorable financial situation of the company and physical condition of the property exceeds general expectations. Two new directors were added to the board at the annual meeting. The names of the present directors are: Harry Oakes, A. G. Slaght, W. P. St. Charles, C. E. Wettlaufer, and Albert Wende. The new directors added to the board are Louis Oakes and W. H. Wright.

Elliott-Kirkland.

Several hundred feet north from the main workings of the Elliott-Kirkland property, a large break has been cut in a contact between the conglomerate and porphyry formations by diamond drilling. Most important, perhaps, is the fact that a belt of conglomerate some 400-ft. in width has been pierced. On the north side of this conglomerate where it comes in contact with the porphyry is where the break occurs. It is understood that the drill passed through a mud seam about two feet in width from which water flowed quite freely. Such mud-seams have been associated with some of the richest deposits in the Kirkland Lake camp, which lends to the discovery more than ordinary interest. It is understood the company contemplates the early development of the contact zone north of the present main workings.

May Re-open Lucky Cross Mine.

Negotiations are said to be under way for the reopening of the Lucky Cross mine at Swastika, which is the jumping-off place on the T. & N. O. railway for the Kirkland Lake camp. The plans are said to call for the organization of a new company. The previous operation and development of the property was conducted prior to the opening up of the Kirkland Lake field. With this camp firmly established and on the threshold of becoming a large gold producer, it may reasonably be expected that such properties as the Lucky Cross, which is equipped with a good plant and milling equipment, will come in for further attention. Although previous development work was on a limited scale, a number of veins containing visible gold were found, and the property as so far developed has considerable merit.

Important Developments at Crown Reserve Properties.

Development work at the Crown Reserve mine at Cobalt is proving a series of veins in the eastern section of the property where the recent important vein was encountered. Since the original discovery was made a number of other promising veins have been encountered and are now being developed. Arrangements have been made for the shipment of the first carload of ore from the first vein discovered in this section of the property. As the ore shoot has contained average values of around 2,500 ounces to the ton, for upwards of 150-ft. in length, it is expected the first car of ore will be exceptionally high grade, and should compare well with the shipments from the property in the early days of the mine. Considerable ore is coming from the old workings of the property. In addition to the revenue of the Cobalt property, the Crown Reserve owns a controlling interest in the Porcupine Crown Mines. This latter property has resumed operations and should add considerably to the revenue of the company in the near future. Ore has been developed on the Porcupine Crown mine to a depth of 1,100 ft.

Testing Adanac Ore.

A trial run of Adanac ore consisting of fifty tons was put through the Temiskaming mill at Cobalt this week. The ore was taken from the drift along the high grade vein recently opened up at the 310 ft. level of the property and is understood to consist of "Mine Run" ore, no attempt having been made to sort the material. No official announcement of the grade of the ore has yet been given out.

Nipissing Will Develop Ophir Property.

The shareholders of the Ophir Mining Company unanimously ratified the deal whereby Nipissing mining company of Cobalt purchased a two-third interest in the Ophir property for $150,000. The Nipissing mining company has been in possession of the property since January 19th. The new owners of the property propose to prosecute development work energetically on the contact, which is found at a depth of 580 ft. on the Ophir. The north line of the property is 1,200 ft. south of the Adanac, and for this reason, coupled the fact that there are a number of large and strong veins on the property, the prospects are considered bright.

Temiskaming.

An announcement of more than ordinary interest has been made to shareholders of the Temiskaming mining company that the company had acquired the property of the Dolly Varden Mines, and Wolfe Silver Mines, situated in British Columbia, on the Kitsalt river about fifteen miles from what is called Alice Arm. This property on previous development has given encouraging results. Mining carried out to date consists of several hundred feet of underground work, as well as several thousand feet of diamond drilling. The purchase price of the property is $900,000. Obligation to former holders of the mine is $450,000 because of the liabilities that the Temiskaming has to assume. A narrow gauge railway has been constructed from the point on the coast known as Alice Arm to the Dolly Varden property. However, some couple of miles of steel have still to be laid and the road is in the hands of a receiver. This financial condition will be remedied and the road completed by the Temiskaming mining company. The terms of the deal are said to enable the Temiskaming to recoup itself for these expenditures out of the mine before paying any portion of the purchase price to the vendors. The properties were examined by Mr. C. D. Keading, manager of the Dome Mines of Porcupine, for the Temiskaming and it is said upwards of two million ounces of silver is in sight. Both the Dolly Varden and Wolfe camps are reported to hold considerable possibilities both as regards extent and richness, and lie within nine miles of each other. It is said that the railway may eventually be extended several miles further to the glacier foot, where rich copper deposits are said to exist. The undertaking is an expensive one, and results will be watched with the keenest of interest by Eastern Canadian mining men.

Allied Gold Mines Will Develop Property at Boston Creek.

Beginning with the early spring an extensive exploration and development program will be carried out on the properties of the Allied Gold Mines, Limited, at Boston Creek. Even at the present time a good deal of work is being done, including extensive diamond drilling to determine the width and value of the veins opened up on the surface of the property. The company was organized late in 1918, for the purpose of acquiring a large acreage of gold mining lands in the Boston Creek area, following the successful developments at the Miller-Independence Mines. The first group of claims secured were the Cullen-Renaud, which adjoin the Miller-Independence on the north, and which has a continuation of part of the rich vein system opened up on the latter property to a depth of 200 ft. It is on this vein that the Allied Gold Mines is driving a shaft to a depth of 100 ft. by using hand steel. It is the intention of the company to instal an electric mining plant early in the spring to facilitate this work. The second group of claims taken over by the company was the O'Donald, comprising some five in number, situated between the properties of the Patricia Syndicate and R. A. P. Syndicate and Boston Creek Gold Mines, Limited. With the completion of the diamond drilling campaign on the O'Donald group it is expected a mining plant will also be installed here for the further development of the property. The capitalization of the Allied Gold Mines is $2,000,000 in shares of the par value of $1 each.

Connell Property Sold.

Dayton, Ohio, interests are said to have purchased outright a three-quarter interest in the Connell property in the Boston Creek district, adjacent to the Miller-Independence property on the east. The owners retained a one-quarter interest in the property. It is understood the full purchase price of the three-quarters interest was paid.

Developing Bourke's Property.

A winze is being sunk at the 200 ft. level of the Bourke's Mines at Bourke's Siding. The vein is said to continue strong in the working and to yield encouraging quantities of high grade gold ore. A drift has been run for a considerable distance at the 200 ft. level and encouraging quantities of good grade ore have been revealed.

Alexo Nickel Ore Shipments.

During the last week in January three car-loads of nickel ore were shipped from the Alexo Mine at Porquis Junction to the Mont Nickel Company at Sudbury for refining. The three cars of ore aggregate approximately 320,000 pounds of ore, the shipment being much above the average for a similar period. The Alexo is the only base metal mine producing in this part of Northern Ontario, and its growth since the outbreak of the war has been comparatively rapid due to the big demand for nickel.

Elliot-Kirkland.

Opening up of the fractured zone recently encountered at depth on the Elliot-Kirkland is being gone ahead with on the surface of the property. The break is in the porphry formation close to the contact of the porphry and conglomerate. Up to the present time it has been opened up at two points a distance of about 400 ft. apart, where it has been found to be about twelve ft. in width and to carry low gold values. It has a general strike towards the shaft of the Kirkland Lake Gold Mines, Limited, and is thought to be a branch of the orebody occurring on the latter. There appears to be some likelihood of this northerly branch being the cause of the occurrence of more or less patchy ore on the break further south where sinking was carried to a depth of 600 ft. on the Elliot-Kirkland.

Sinking Shaft on Kirkland-Townsite.

The shaft on the Kirkland-Townsite property has been sunk to a depth of over forty feet. The vein is well mineralized at this depth, with considerable graphite occurring in the seams and along the walls. The shaft will be sunk to a depth of 100 ft., where lateral work will be undertaken.

Tough-Oakes.

The plan for the amalgamation of the Tough-Oakes Gold Mines with the Sylvanite and Burnside properties, the latter controlled by the Aladdin Mining Company of Cobalt, appears to be looked upon with much favor by some of the leading interests involved, and the possibility of bringing about the proposed merger is considered very promising. If the merger is successfully completed it should prove of much benefit to the three properties mentioned. The Tough-Oakes is equipped with a powerful mining plant and a milling plant with a capacity of 140-tons per day which would be immediately available for the development and production of ore from all three properties. It would be possible to develop all three properties from the one central shaft on the Tough-Oakes. This is particularly to be desired where the orebodies are in some cases extensions of veins running from one property onto the other. The three properties each have a large acreage and the deposition of ore on each is related, either by being the lateral continuation of veins or the downward continuation of orebodies dipping from one property into another. The new directorate of the Tough-Oakes, headed by Harry Oakes, is making a change in the management of the property and a new manager is being sought. Similar changes are being made in other departments.

Kirkland Lake Mine Nearing Producing Stage.

With the new shaft of the Kirkland Lake Gold Mines, Limited, nearing the 500 ft. level of the property and being connected up at each level with the old workings of the property, which were carried to a depth of 700 ft., and with considerable lateral work on each level, facilities for hoisting ore to the new 150-ton mill will be provided. Everything should be in readiness for the commencement of production within the next two weeks. However, it is not considered likely that actual milling will commence until some time in March, when it is thought a considerable improvement will have taken place in the supply of labor available, and the difficulties attendant upon cold weather will not have to be contended with.

A good deal of the ore on the dumps is from development work and will carry gold values of around $8 per ton, but the ore developed underground is said to carry value in the neighborhood of $15 per ton. Allowing for the mill running at two-thirds capacity on this latter grade of ore the output of the company would approximate about $45,000 per month. After the first few months of operation and with the mill working at capacity this production should be increased by about fifty per cent. The future outlook of the Kirkland Lake Gold Mines is considered to be bright. The controlling interest in this company is held by the Beaver Consolidated Mining Company of Cobalt.

Resumption of Work at Schumacher Mine Expected.

The Schumacher Gold Mines, Limited, of Porcupine is expected to be the next important gold mine in this district that will resume operation. Previous to closing down in point of production the Schumacher was next in importance to the Porcupine-Crown Mines. However, with the proposed additions to the mill completed, it is expected to be second only to the McIntyre-Porcupine Mines. During the fiscal year ended March 31st, 1918, the company spent about $51,000 on additions to the milling and mining plant, the capacity of the mill being increased from 110 to about 180 tons per day. The mining plant was enlarged for the operation of 25 machines instead of 14 as were formerly employed in development and supplying ore for the mill. With the addition of another Hardinge ball mill and another tube mill, it is officially announced the capacity of the mill could be brought up to 300-tons per day. With this addition to the plant installed it is evident the production of the property would be in the neighborhood of $60,000 per month, as the average grade of ore is stated to be between $6 and $7 per ton. The future plans of underground development call for the sinking of the main shaft to a depth of 1,000 ft., at which point lateral work will be carried forward, with the object of encountering the downward continuation of the present known orebodies. This plan is considered to be important and full of promising prospects, owing to the fact that excellent ore was developed at depth on the McIntyre-Porcupine and Hollinger properties which adjoin. Especially is this true of the McIntyre, where it was not until a depth of 1,000 ft. had been attained that the property had definitely established itself as a mine of big proportions. With similar geological conditions prevailing on the Schumacher, it is considered highly probable by prominent mining men that similar conditions may be encountered on this property. The mine closed down July 15th, 1918, at which time a surplus of

$81,901 was shown. Since that time the shareholders have authorized the sale of 100,000 shares of treasury stock at not less than 45 cents per share. Thus, sufficient funds should be available for the carrying out of the extensive program outlined, and the placing of the property on an earning basis sound enough to warrant the payment of dividends. The authorized capitalization of the company is $2,000,000 divided into 2,000,000 shares of the par value of $1 each. Of this number of shares some 1,850,000 shares have been issued. With the additional one hundred thousand shares authorized to be sold the treasury will still have fifty thousand remaining. The current year should be an important one in the affairs of the Schumacher.

BRITISH COLUMBIA.

May Operate Ladysmith Smelter.

If the assurances given by those interested are implemented by action there is a prospect that the Ladysmith smelter, of Ladysmith, B.C., will be in operation again before long. Mr. W. J. Watson, who is in charge of the plant, has just returned from a conference with Mr. Seiberling, of Akron, Ohio, and associates. He states that it is Mr. Seiberling's intention to commence, without delay, the development of several good North Pacific mining properties. One of these is situated on Latoache Island, and is adjacent to the well-known Alaska-Gatineau Copper mine which is a regular shipper to the Tacoma smelter. Other first-class prospects have been secured, and will be opened up with as little loss of time as possible. The intention is to open the Ladysmith smelter again, and this time permanently, when there is enough ore in sight to secure a sufficient supply to keep the furnaces of the smelter in continuous operation.

Mining Convention at Nelson.

Mr. Fred A. Starkey, President of the Associated Boards of Trade of Eastern British Columbia, has announced that the Northwest International Mining Convention will be held at Nelson, B.C., this year. While the dates had not been definitely fixed they would be placed either in the latter part of the month of June or early in July. It was explained by Mr. Starkey that the Spokane Convention was to take place at that city in March. He will attend and proposes inviting the delegates to Nelson and to ask them to arrange a time that will meet with the convenience of the majority. It is understood to be the wish of most of the American mining men that the International Convention should be assembled at Nelson and Mr. Starkey is asking his fellow citizens to give the visitors just a little better time than on the last occasion, which in point of instruction and entertainment stands out as almost the ne plus ultra.

Copper Miners' Wages Reduced Owing to Lower Prices for Copper.

Notice has been posted at the Grand Forks (B.C.), Smelter of the Granby Consolidated Mining & Smelting Company to the effect that the company proposes reducing the wages of its employees according to schedule affected by the drop in the price of copper. No statement is yet made as to the price at which the metal will be placed.

Molly Gibson Employees Victims of "Flu."

Operation of the Molly Gibson mine, near Nelson, B.C., has been seriously interfered with recently by the ravages of the Spanish influenza. The plague struck the camp without warning. Ronald Stonier, the superintendent, and one of the miners were dead before anything was known of the trouble outside the immediate district. Of the eleven men working at the mine seven fell ill and, when the news was received, a relief party consisting of twelve men, among whom was a physician and one of the engineers of the Consolidated Mining & Smelting Company, started out in order to take the five reported to be still alive to the Nelson Hospital. Subsequently two of the latter succumber and another miner was killed by a slide shortly after setting out for the city. Thus there were five deaths within a short period and it has been suggested that the series of fatalities will result in the closing down of the property for the winter. This, however, has not been confirmed.

With reference to the "Flu" and the difficulties which some mining operators have experienced because of it, an interesting account is given of the method adopted by a mining man with extensive interests around Sandon and Silverton, B.C. He has an understanding with his men that during the epidemic none of his men are to leave his employ, nor to come down from the mines for a "lay-off." On his part he undertakes to send no new men to work. The particular properties that he has in charge are thus rigidly quarantined and he himself, according to the arrangement, cannot go up to them, even on a trip of inspection. Consequently he is forced to direct operations by telephone. While this is awkward, it is thought better than to take the chance of the influenza gaining a foothold in any of the camps in question as, judging by other experience, once established at such centres it does not leave until the lives of many are seriously jeopardized and the work completely disrupted.

Thomas French Explains Difficulties.

Thomas French, manager of the French Complex Ore Reduction Company, the plant of which is situated at Fairview, B.C., a short distance from Nelson, B.C., complains that the action of the Provincial Government in deducting more than $6,000 from a bond issue of $25,000 guaranteed by the Government last year in order to pay back interest on previously issued bonds and delay experienced in obtaining the money, have seriously interfered with his programme for the demonstration of the French process for the treatment of complex zinc ores.

The position in which he finds himself is explained, from his standpoint, in a recent interview as follows:

"In 1916 the late government guaranteed a $40,000 bond issue to enable the company to equip the Fairview plant for the purpose of demonstrating its process. This was $10,000 less than Mr. French at the time estimated he would require, but although the price of machinery rose considerably before the money became available, he was able to keep within his estimate. The terms of the Act, however, prevented Mr. French from borrowing money from the bank to finance operations and to purchase ore. Delays, while overhead expenses continued—the Act compels the company to operate without ceasing — used up additional funds.

(Continued on page 130.)

Roseberry-Surprise Mill Closed Down.

Sandon, B.C. — The Roseberry-Surprise Mill has closed down and the ore milled at this plant in the past will be milled hereafter by the Roseberry Mill. To the community of Sandon this is a decided setback, as it constituted one of its chief industries and employed a large number of residents, mostly men of families, who will be without work.

Florence Silver Mining Co.

Ainsworth, B.C.—For ore shipped in the month of December the Florence Silver Mining Company, operating at Ainsworth, has received a preliminary settlement of $27,200 net. The shipment amounted to 400 tons and the adjustment is at the rate of $68 a ton on 90 per cent of the metallic content, leaving a final payment to be based on market conditions. January shipments amounted to 350 tons.

Rambler-Cariboo.

Slocan, B.C.—The Rambler-Cariboo Mines in the Slocan has declared a dividend of $17,500 according to a recent announcement. This is at the rate of a cent a share on the issue of 1,750,000 shares. Payment will be made February 15 to stockholders on record February 5. The forthcoming disbursement will increase the total of dividend payments to $560,000. An estimate places the company's surplus at $55,000, which includes ore in transit and at the smelter, of which there are 60 tons of lead concentrates valued at $7,500 net and 165 tons of zinc valued at $20 a ton. Operations at the mill have been interrupted by a snowslide which halted the flow of water. The slide which came from Payne Mountain, covered the flume for 200 feet to a depth of 20 feet in places. The snow is being removed and the flow is expected to be restored soon. There is a difference of 1,200 feet in the elevation of the mine and the mill. Little exploration was done in 1918 owing to the high cost of supplies, transportation and labor.

Mining Convention at Vancouver.

March 17, 18 and 19 are the dates selected for the international mining convention which is to be held at Vancouver, B. C., under the auspices of the Vancouver Chamber of Mines. Committees are to be formed in each mining centre of the province in order that every district will be represented not only by delegates, but by a representative display of its mineral products. Prominent mining men of all parts of America are to receive invitations and a special effort is to be made to secure the attendance of professors of mining and geology of the different universities of the continent. One of the features is to be a display of mining machinery which, if the officials in charge realize their ambition, will be the finest and largest of its kind ever attempted in Canada. The Convention has received the endorsation of Hon. William Sloan, Minister of Mines, and of other members of the Provincial Government.

Rich Samples From Proserpine Mt. Gold Properties.

Assays have been received of a number of samples taken from the Proserpine Mountain Gold prospects near Barkerville, B. C., which are promising. These were looked forward to with interest by the owners as they came from the sulphide, about 13 feet beneath any sign of surface oxidation. The returns follow:

No. 1: From south side of shaft, 9 feet 6 inches across ledge, $18.10.

No. 2: Across 12 feet no north side of shaft, $22.70.

No. 3: A continuation of No. 1 across three feet of schist outside of the vein, $7.70.

No. 4: A selected sample of mineralized schist from a seam in ledge, $9.70.

No. 5: A sample of galena, no sulphide visible, gold, 80 cents, silver $25.70, lead 51%.

No. 6: Taken from bottom of shaft, about 95% of silica, carrying approximately 5% of steel-grey fine grained sulphide. Several miners who are familiar with this kind of ore have pronounced it telluride. This sample gave a return of $184.80 in gold and $3.20 in silver perton.

No. 7: A sample of oxidized ore from near the surface, $165.20.

The owners are not sure whether part of the values come from the silver or whether altogether from the sulphide. If the entire values were contained in the latter it would indicate a very rich sulphide, or a telluride ore. Interest is lent to this discovery by the fact that a number of years ago John Brodie, an old time Cripple Creek Miner, discovered several pieces of rich telluride float in the vicinity and spent several years prospecting for the mother lode, without success.

Considerable of this rich sulphide was noticed by these prospectors at the bottom of their shaft, especially in the rock fractures, but not knowing its value little attention was paid to it. If this proves to be telluride ore it will mean much to the owners as well as to the district generally.

The above samples average up well with those taken by a government engineer higher up the shaft. In order to avoid deceiving themselves the owners employed an outsider — an experienced prospector — to do the sampling.

May Close Merritt Collieries.

The immediate future of the coal industry at Merritt, B. C., is reported to be uncertain. For some time the Canadian Pacific Railway company has been taking a considerable proportion of the output of that field for steaming purposes, a use to which the coal is well adapted. Recently it has been necessary, according to the operators, to increase the selling price because of the demands of men for more wages and the generally high cost of production. The company, apparently, does not care to pay at the higher rate and has cancelled its contract. If some arrangement cannot be made to continue the former business relations it is predicted that the colleries affected either will be forced to close down or to materially curtail their output. The Hon. Wm. Sloan, Minister of Mines, has been asked to assist in the effort to reach an adjustment of the difficulty to which he has acquiesced, but whether the representations which have been made through him, as well as from other sources, will be effective is doubtful at the present moment.

"Bob" Griffith, a veteran Alaska "musher," with a heavy armed guard and two dog teams, arrived at Seward, Alaska, recently with $400,000 worth of gold dust from the Iditarod for shipment to Seattle.

Hoisting Machinery

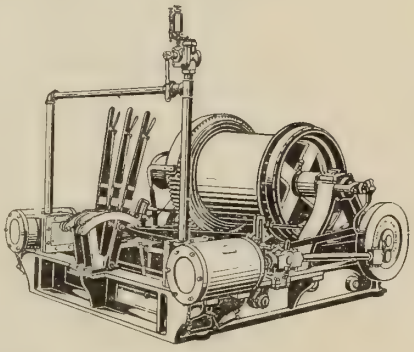
BUILT TO SUIT YOU AND YOUR NEEDS

We offer you STEAM DRIVEN HOISTS, with Boiler, or without Boiler, ELECTRIC DRIVEN HOISTS, BELT DRIVEN HOISTS,

In any of the following sizes:

10	Horse	Power,	to	Lift	2,600 lbs.
15	"	"	"	.....	4,000 "
20	"	"	"	.....	5.500 "
25	"	"	"	.....	7,000 "
32	"	"	"	.....	8,000 "
40	"	"	"	.....	10,000 "
50	"	"	"	.....	12,500 "

We also offer you any diameter of Drum up to 48", to give you the Hoisting Speed you desire.



HAVE YOU SEEN A COPY OF OUR NEW MINING CATALOGUE?

Marsh Engineering Works Limited, Belleville, Ontario

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Silver Assay Balance, Troemner 10 in. Beam, Weighs easily to .05 MG. Sensitive to .03 MG. Price $60.00.

MILTON HERSEY CO., LTD., MONTREAL

FOR SALE—TWO CLAIMS

Adjoining Hattie Gold Mines in Coulson, Beatty Area
Would give Working Option to responsible parties

H. C. CROW, 184 Sunnyside Ave., TORONTO

Mr. A. I. Fisher, member of the British Columbia Legislative Assembly for Fernie District, delivered an address in the House recently deploring the waste existent in the Crowsnest Pass Coal Fields in the manufacture of coke. He declared that it was a pity that the by-products of the coal continued to be driven off into the air by the use of the obsolete bee-hive ovens. It was only a matter of chemistry, he declared, and the application of such measures as could be defined by experts which would permit British Columbia to profit by the manufacture of many commodities which, in pre-war days, were held as monopolies by other countries.

Electric Smelter for Seattle.

The announcement that the Smelters Steel Co. has decided to install electric furnaces for the smelting of British Columbia iron ores on the commercial waterway near Seattle, Wn., has been received with special interest in this province because of the efforts being made to interest capital in such an industry on the Canadian side. Whether the company will proceed with such an installation for the treatment of British Columbia ores in view of the provincial tax of 37½ cents per net ton of ore mined is considered doubtful. It will be recalled that the B. C. Government, in furtherance of its desire to see the industry initiated in the province, has offered a bounty of $3.00 per net ton of pig iron manufactured from local ores and $1.50 per net ton of pig iron produced from foreign ores. This, it is considered, is a satisfactory recompense, where the iron is made in British Columbia, the bounty being substantially above the tax. However, it is said that the Smelters Steel Company proposes installing four electric furnaces, with a total capacity of 30 tons of output in high grade gray iron per day. The furnaces are to be of the arc type with one electrode to each furnace. The company is reported to have abundance of the flux necessary for smelting purposes near its mines.

According to information received, the management of the Northport Smelter contemplate an indefinite closing of the plant.

P. M. CHRISTOPHER ELECTED PRESIDENT, DISTRICT 18, U.M.W.A.

Announcement has been made of the result of the election of officers to the Mineworkers' Union, District 18, U.M.W. of A., which include Eastern British Columbia and the Province of Alberta. P. M. Christopher, Blairmore, has defeated David Rees, of Vancouver, B.C., by a majority of 1486 for the presidency. Alexander McFegan, of Brule, Alberta, defeated William Dickenson, of Fernie, B.C., by 1,100 for the vice-presidency. G. Christie, Bellevue, was elected over William Potter, of Fernie, by 528 for the position of auditor. A second election had to be held before the offices indicated were filled, as the constitution requires that every officer must have over 50 per cent of the votes cast and, in each case originally, there were more than two candidates in the field. The names of other officer holders follow: Secretary-Treasurer, Edward Browne, Taber, Alta.; International Board Member, Robert Livett, Bellevue, Alta.; Tellers, W. Patterson, Blairmore; Patrick Conway, Brule; and William Hayson, Coleman, Alta.; Delegate to Dominion Trades & Labor Congress, Frank Wheatley, Bankhead, Alta.; Delegate to Alberta Federation of Labor, A. Cocchioni, Wayne, Alta.; District Executive Board, Frank Brindley, Fernie, B.C.; John Brooks, Bellevue, Alta.; Charles Peacock, Lethbridge, Alta.; Frank Wheatley, Bankhead, Alta.; John Kent, Wayne, Alta.; and David Fraser, Brule, Alta. The installation of these officers will take place on March 1, probably at the conclusion of the Annual District Convention. The newly elected officers will be charged with the conduct of negotiations for the renewal of the working agreement with the Western Coal Operators' Association, which agreement expires on March 31 next.

NEW HAZELTON GOLD-COBALT MINE.

The property of the New Hazelton Gold-Cobalt Mines, Limited, which is situated on the west side of the Rocher de Boule Mountain, and close to the line of the Grand Trunk Pacific Ry. Co., gives promise of developing into a producer of importance. Returns have been received on a carload of gold-cobalt-molybdenite ore which was shipped last August to the government ore testing plant at Ottawa. They show considerable values in the three minerals mentioned as well as some in nickel and arsenic, the gross values of the 26 tons, based on molybdenite at $1 per lb., cobalt at the same, nickel at 50 cents, arsenic at 5 cents and gold at $20 being placed at $2,399.45. This company some months ago shipped 28 tons of its ore to the Anyox, B.C. smelter, which gave returns of $1,090.00 in gold, or $53 net to the ton in gold alone after payment of railway and smelter charges. As there is no means at Anyox for saving other values, no return was given on other content. The opening up of the property is proceeding, work now being under way on copper veins as well as on the rich gold-cobalt vein. Fifty sacks of the latter ore are said to be ready for shipment, which is being constantly added to with a view to its being forwarded for treatment in the spring.

B. C. Government Engineers May Examine Metalliferous Mine or Works.

Mining engineers in the employ of the Government of British Columbia, of whom there are six, each having charge of one of the mineral districts into which the Province has been divided, are to be given authority to make examination of any metalliferous mine, reduction works, or concentrating plant of the Province. Non-compliance entails a fine of from $10 to $500. It is not suggested that the engineers have received anything but the most courteous treatment from the mine and smelter operators, but Hon. Wm. Sloan, Minister of Mines, proposes that the engineers shall be provided for the fullest legislative authority in the carrying out of the responsible duties of their offices.

INTERNATIONAL MINING CONVENTION

VANCOUVER, B.C.

March 17, 18 & 19

Under auspices of British Columbia Chamber of Mines, Leaders of Mining World in Canada and the United States will take active part in the proceedings.

Most comprehensive display of ores and up-to-date mining machinery ever seen in Canada.

Everyone interested in mining operations should arrange to visit Vancouver next month.

Write for full particulars to

JOHN D. KEARNS, Manager,
Rogers Building, Vancouver, B. C.

In the last month the Rossland mines have been adding quite a number of men to their working forces.

The estimated quantity of iron ore mined in the United States in 1918 amounted to 69,712,000 gross tons, compared with 75,288,851 tons in 1917, a decrease of 7.4 per cent. The estimated shipments of ore from the mines in 1918 were 72,192,000 gross tons, valued at $246,043,000, compared with 75,573,207 tons, valued at $238,260,444 in 1917, a decrease in quantity of 4.5 per cent but an increase in value of 3.3 per cent. The average selling value of the ore per gross ton at the mines for the whole United States in 1918 was $3.41, compared with $3.15 in 1917.

About 86 per cent of the iron ore mined and shipped in 1918 came from the Lake Superior district, in which about 60,092,000 gross tons were mined and about 62,285,000 tons were shipped in 1918, compared with 63,666,068 tons mined and 63,854,752 tons shipped in 1917, representing decreases of 5.6 per cent and 2.5 per cent, respectively, in 1918. The average selling price of iron ore at the mines in the Lake Superior district in 1918 was $3.50 a ton compared with $3.28 a ton in 1917. The quantity mined in the States in this district—Michigan, Minnesota, and Wisconsin—showed a decrease and the quantity shipped in Minnesota and Wisconsin showed a decrease, but the shipments from Michigan apparently increased slightly. The decrease in the quantity mined in the Lake Superior district, about 3,574,000 tons, was partly made up from stocks, which were evidently depleted to the extent of about 2,202,000 tons in 1918.

PROVINCE OF QUEBEC

MINES BRANCH

Department of Colonization, Mines and Fisheries

The chief minerals of the Province of Quebec are Asbestos, Chromite, Copper, Iron, Gold, Molybdenite, Phosphate, Mica, Graphite, Ornamental and Building Stone, Clays, etc.

The Mining Law gives absolute security of Title and is very favourable to the Prospector.

MINERS' CERTIFICATES. First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is $10.00, and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

SIX MONTHS AFTER STAKING. At the expiration of six months from the date of the staking, the prospector, to retain his rights, must take out a mining license.

MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of $10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

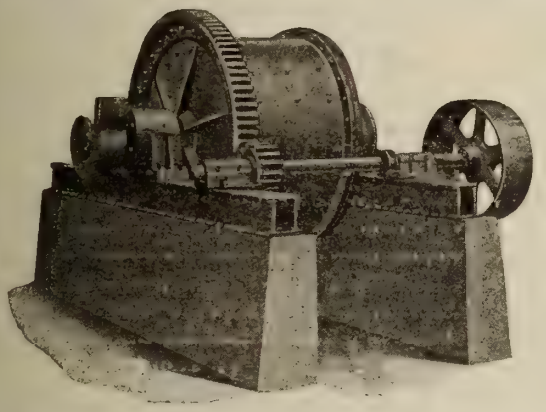
MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of $5 an acre for SUPERIOR METALS, and $3 an acre for INFERIOR MINERALS

The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized belts are known to exist.

PROVINCIAL LABORATORY. Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY, 228 ST. DENIS STREET, MONTREAL, for the determination, assays and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

HONOURABLE HONORE MERCIER,
MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC.



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All Kinds of MINING MACHINERY, CRUSHER JAWS, HAMMERS AND HAMMER TIPS, LINERS FOR CYCLONE BEATERS BUCKET TIPS, STAMPS AND DIES, DREDGER POINTS

Mild Steel Castings for all purposes

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Our Special Quality "HYMANG" BALLS FOR BALL MILLS REDUCE COST OF ORE PER TON CRUSHED

CANADIAN BRAKESHOE CO., LIMITED

SHEBROOKE, QUEBEC

New Copper Wage Scale.

Boston—A new minimum basis of 18 cents a pound will be adopted by the copper industry as a basis for wages to be paid the mine workers. Word to this effect will be conveyed to the various copper camps as a result of conferences among producers, government officials and labor representatives.

The sliding scales of the several districts throughout the country will be resumed as a basis for paying the mine workers, but should the metal drop below 18 cents a pound the wages will not be affected. Any excess in price over that figure will produce a higher wage.

The 18-cent minimum will provide for payment in the larger camps as follows:

Camp	Day
Butte	$4.75
Clifton	4.00
Globe	4.90
Miami	4.90
Jerome	4.90
Bisbee	5.00

The reduction from current wages will average $1 per day should the immediate adoption of the minimum wage be found necessary.

No specified period will be covered by the mining companies in promulgating the notice of an 18-cent minimum.

The January wages were all paid on the basis of war time conditions and 32-cent copper. The current month has witnessed small sales only on a downward tendency to 18½ cents a pound. Just what the February scale will be must depend on copper prices yet to be made.

(Continued from page 125.)

"Last season the French Company secured an additional bond guarantee of $25,000. This sum, he estimated, if the company were granted an amendment to the Act which would enable him to finance the purchase of ore through a bank, would have enabled him to demonstrate the commercial possibilities of the process. It was his plan, he stated, to follow the usual smelting practice of borrowing money against metals on hand and awaiting sale in the market. In this way ore could be purchased and the plant operated directly it had got underway. The $25,000 issue was guaranteed, but the amendment to enable borrowing against metal stock on hand was not made and Mr. French learned recently that the government had deducted an amount of $6,131 from the $25,000 and employed it to pay interest on the $40,000 for three years to December 1st last. There was much delay in making the second issue available, which further increased expenses. None of the $25,000 was received by the French Company until November 6. The original Act states that the province guaranteed the interest and agreed to pay it out of consolidated revenue fund. The intention was that the company should get the full amount of the bond issue. It did so in the case of the $40,000 but has been credited with only between $18,000 and $19,000 of the issue guaranteed last year.

"Mr. French is now asking that the government rescind its action of deducting the $6,131 from the $25,000 issue. If that is done the amount still available for the use of the company, and which Mr. French believes will be sufficient to enable it to demonstrate its process, will be nearly $11,000. Hence the company has actually spent only about $14,000 of the $25,000 bond issue guaranteed by the Province last year."

Oxy-Acetylene Welding and Cutting

Prest-O-Lite Operator Repairing an Expensive Casting at Trifling Cost.

Prest-O-Lite Welding Saves Replacements.

The Prest-O-Lite Process of Oxy-Acetylene welding is daily opening up new possibilities for economy and efficiency in the factories, mills, railroads, mines and machine shops of Canada.

For repair work, as well as for manufacturing, it is saving time and money in thousands of plants. Valuable time is saved through one Prest-O-Lite repair. Important machinery, machine parts and tools are saved from the scrap pile, and expensive replacements are frequently avoided.

Prest-O-Lite PROCESS

employs both gases (acetylene and oxygen in portable cylinders. Prest-O-Lite Dissolved Acetylene is backed by Prest-O-Lite Service, which insures prompt exchange of full cylinders for empty ones; provides dry, purified gas, insuring better welds, quicker work and lower operating cost.

Apparatus consists of an equal pressure blow pipe, automatic regulators and gauges, and all necessary equipment. Adaptable for oxy-acetylene cutting by the addition of special cutting blow pipe.

Thorough instructions are furnished free to every user of Prest-O-Lite Dissolved Acetylene. Any average workman who understands metals can learn the welding process quickly and easily.

We will gladly send illustrated literature and interesting data showing actual instances of savings made by others. It may suggest valuable ideas to you. Write for it.

Address Department C-108.

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World's Largest Makers of Dissolved Acetylene

:-: EDITORIAL :-:

THE GOLD MINES.

The interpretation of the recent report by Lord Inchape, head of the British Commission, which made what is considered to be a complete survey of the status of gold, is considered here as pointing toward the fact that this country is looked to as a factor that will prevent too great a decrease in the output of gold in the British Empire. That Porcupine and Kirkland Lake, as well as Boston Creek will at least do their share is already evident. The big way in which preparations are being made to carry on operations during the coming summer, appears to assure a greater production for 1919 than any previous record in the history of gold mining in Ontario. By the beginning of 1920 the standing of the yellow metal industry of this country will probably be an agreeable surprise for those not in direct contact with those directing mining operations, and in possession of facts concerning the big plans for the very early future.

ANNUAL MEETING CANADIAN MINING INSTITUTE

The 21st annual general meeting, to be held at the Windsor Hotel, Montreal, on March 5th-7th, 1919, should be very interesting to those who attend. During the war the meetings have been held regularly and have proven useful because the interchange of ideas was more than ever necessary, and because encouragement and inspiration for those facing many difficult problems resulted from the "getting together." The Institute is now faced with other problems that demand serious consideration; but most of those who attend the meeting this year may do so with lighter hearts.

During one short year depression, which was the natural result of the conditions at the front, has given place to the joy of a victory greater than any dared hope for. Some of our victorious army are home after years overseas. The Institute will give these men a suitable welcome. Not until the next meeting can we have a real reunion however, for the greater part of the Canadian army is still overseas.

It is very fitting that the Canadian Mining Institute should this year extend to members of the American Institute of Mining and Metallurgical Engineers an invitation to attend this meeting in Montreal. To the Americans the Allies owe no small share of the victory, and none will be more ready to acknowledge it than Canadian mining engineers.

"NO GERMAN NEED APPLY".

Mr. H. V. Winchell, president of the American Institute of Mining and Metallurgical Engineers, speaking at the New York Meeting, commented on the treatment that prospectors from other countries receive in Canada. He pointed out that the United States mining rights are granted only to citizens or those who have declared their intention to become such. In Canada the right to develop minerals is open to all, whether British subjects or not.

Mr. T. W. Gibson corroborated the statements of Mr. Winchell, but in doing so made it clear that no alien enemy is entitled to such rights in Canada. Germans and other alien enemies will receive no mining licenses in this country. An endeavor should be made to see that they do not acquire rights in indirect ways.

LABOR AND CAPITAL.

There have always been discussions on the subject of 'labor and capital', and probably always will be. It is doubtful whether, in modern times at least, there has ever been such general interest in the discussion as at present. Even before the war there was a feeling that a storm was brewing in industry. There was not only dissatisfaction on the part of the employees, but there was a feeling on the part of the employers that there was reason for discontent. There was a good deal of doubt, however, as to what was the real reason for such discontent, and unreadiness to believe that it could be removed simply by increase in wages.

Throughout the period of the war there has been a rapidly growing idea that the real ground for discontent is that in our industries we are not truly democratic. There has been a tendency to degrade labor by making it uninteresting. The incentive to work has been to too great an extent measured only by the things that can be bought with the wages. The workman has not had a normal interest in his work. The removal of this cause of discontent is a task in which leaders of capital and labor can well join forces.

The problem and an outline of a scheme for solving it has been admirably pointed out by Mr. C. V. Corless, At the recent meeting of the American Institute of Mining and Metallurgical Engineers, Mr. Corless in an excellent, earnest address urged leaders in industry to

take up the problems with their employees. At the meeting of the Canadian Mining Institute this week there will be discussion of the subject.

In bringing this subject to the serious attention of the people, the Canadian Mining Institute, through Mr. Corless, has played a leading part. We trust that the discussions this week will show that the Institute is behind Mr. Corless and that it is not too far behind to be effective.

ITALY UTILIZES VOLCANIC POWER.

The present enormous price of coal in Italy, according to the Italian Bureau of Public Information, has resulted in the realization of an idea which at first thought seemed but a dream, but which instead has been developed in a marvelous manner, and is assuming quite considerable importance; this is the industrial exploitation of one of the features of vulcanism and that is the natural heat emitted from the soil in those regions more or less volcanic in character.

The first experiments along this line were made some years before the war by Prince Ginori-Conti in Tuscany at Larderello, near the salt mines of Volterra, a region extensively covered with volcanic formations, the most wonderful being the so-called "soffioni," which are certain volcanic vents emitting powerful jets of very hot steam containing boric salts and various gases used in the extraction of boracic acid. Instead of limiting the use of these steam-jets, as in the past, to extracting the salts contained in the exhalations of these natural vapor-vents, the ejection of the steam is stimulated by boring holes. In this way it is possible to obtain powerful jets at a pressure of two to three atmospheres, according to the locality, and in some exceptional instances as high as five atmospheres, the temperatures varying from 150 to 165 degrees Centigrade. These jets maintain their force and temperature unchanged for many years, and they are not affected even when other openings, not too near each other, are bored in the ground, proving that they do not influence each other reciprocally, so great is the underlying thermic energy below. In 1905, Prince Ginori-Conti applied this natural steam to a 40 H.P. engine, using only a small section of the Nenella fissure, which is the most powerful "soffione," the steam ejected having a pressure of five atmospheres.

The results obtained during several years of experimentation were satisfactory, so that he continued to make larger and deeper borings, measuring the force of the steam ejected; combined, this force could operate engines of many thousand horsepower.

In 1912 an experiment was made, very wisely on a more modest scale, but sufficient to obtain conclusive results, for which a 300 H.P. turbine-alternator was used.

Later, because of the enormous increase in the price of coal, the Prince decided to exploit the thermic energy of these soffioni on a much larger scale, but as other substances are emitted with the steam, among them sulphuric acid, which corrodes metals, particularly iron and therefore the pipes in which the steam was to be collected, he attempted to use this steam only for heating. Three turbine-alternators of 3,000 kilowatts each were installed, fed by boilers at low pressure not heated by coal or other combustible fuel, but by the natural steam, superheated to 165° C., issuing from these soffioni and piped and carried to the boilers.

To-day the works at Larderello have a central plant of 16,000 H.P., operating without interruption and distributing current to Florence, Livorno and Grosseto; its capacity is soon to be increased.

Here we have a new and oriignal utilization of Italy's natural wealth; current is generated not by the use of "white coal" (water-power), but by means of heat energy of volcanic origin.

As the natural steam available at Larderello and the surrounding country is, one might say, unlimited and depends upon the number of bore-holes made in the boraciferous soil, the great possibilities for further development are readily seen.

WOULD DEPORT ALL ENEMY ALIENS.

That all enemy aliens should be deported from Canada, and that the Canadian Government should be careful to retain full control of immigration to the Dominion, whatever other concessions may be granted at the Peace Conference, were the two chief points of the resolution unanimously adopted by the Legislature of British Columbia recently. The debate on this subject was of special interest to the coal miners and the workers of all industrial sections of British Columbia, but it was followed with particular keenness by the miners of Vancouver Island Coal Areas, because the employment of aliens in the mines has for years been resented by the English speaking classes of these sections. Hon. Wm. Sloan, Minister of Mines, who is the representative of the latter districts in the House, spoke strongly on their behalf, supporting the proposal that the Dominion Government should be asked to deport all enemy aliens and moving an amendment to the effect that "Canada's representatives at the Peace Conference be asked to adhere firmly to the principle that Canada shall always exercise full control over immigration to the Dominion." He not only wanted aliens put out of the country, but wished to be sure that, once out, they would be kept out. This was a matter, he said, of primary interest to his constituents. The coal miners of the Island, and in fact of the whole of the Province, had furnished considerable quotas to the Canadian Army. Their war record, as to fighting men provided and in every other respect, was one of which they were proud. Now those who had gone were coming back to find, in many instances, that while they fought for their country at $1.10 a day, aliens had been filling their places at home at high rates of pay. Their demand was that all enemy aliens should be returned whence they came, and their places filled by returned soldiers as far as possible, and where not possible by British subjects. Recent statements indicated that the whole question of immigration was to be discussed at the Peace Conference. It was possible that, at such an international conference, a disposition was developed on the part of some delegates to make concessions. He felt that Canada should not give way in the slightest on the principle that her Government control the character of the tide of immigration which was bound to flow from the mixed populations of Europe and Asia.

Correspondence

The Leasehold System.

To the Editor of the Canadian Mining Journal:

Sir,—It would be futile to deny that the leasehold system as applied in Australia to the mineral lands, have proven a great success there. But if you expect a success for that system in Canada, you must also introduce the referendum and recall in the Dominion and Provincial Governments. That is the very thing that makes for success in Australia, and the lack of which spells failure whenever leasehold is applied in Canada.

May I call your attention to the fact that all mining lands in the Gowganda and portions of the Montreal River and Sudbury Mining Divisions can be acquired only under the leasehold system. Prospecting and staking can only be done under the authority of a special permit issued by the Department for a consideration, and no work on claims staked may be performed without a written permit from the Department.

As the first prospecting and staking for silver within the Gowganda began in 1907, and as staking has been carried on more or less continuously, I think it is fair to claim that the leasehold system as applied under Canadian system of Government, have been given a fair trial.

Some of us who have seen the population of the camp dwindle from some thousands in 1908-09 to the at present probable three hundred. We have seen a town represented by all lines of business, including three banks, seven hotels, a dozen stores, several assay offices, post office and mining recording office, dwindle to as at present, one assay office, post office, two stores, three hotels. We have seen the country surrounding Gowkanda alive with prospectors, miners and representatives of mining companies busy trenching, building camps, bringing in and putting up machinery, everyone feeling elated over the promising possibilities of their different holdings. To-day we have four or five working properties, deserted and tumbled down camps, rotten camp equipment and tools, useless machinery, in all representing several hundred thousand dollars in capital and labor lost and destroyed.

Every year has brought increased destruction to the forest by fires, until to-day it is almost impossible to travel through the area owing to dead and fallen timber.

Is there anyone, who dare say that the leasehold system as applied to Gowganda, has proven beneficial.

That the desertion of the camp was not due to lack of confidence in its mining lands, is attested by the unusual number of leased claims held in the camp.

When in 1911 the operators and others entrusted in the development of this section, called on the Government for the assistance that they felt entitled to receive, we were advised that the Government's policy was to protect its forest reserves rather than to encourage further prospectors, miners or railroads. The result of this was two-fold: Large numbers owning leased claims left the camp, others stayed and secured a lease, then left, their equipment going to waste; everyone interested in the development of the camp saw in every green bush an enemy to be destroyed, and the increasingly large areas of burnt country shows the result. Had mining been encouraged, dead timber would have been cut and used and a revenue derived therefrom. Also, the removal of dead timber would have proved a great factor in saving other green areas.

Therefore the Government's policy had proved destructive to both mining and forestry and given a black eye to the leasehold system which is apparently known by the people of Manitoba.

These conditions, as described existing in Ontario, could not exist anywhere under the Australian form of Government.

Of course, one mine has been able to carry on continuously and develope an enormous body of ore, besides being a continuous shipper. But it is well known in this section, that at several times during the first five years of its operation the engineer in charge advised closing down. He was overruled by the owner, whose capital and insistance to carry on have brought its well earned reward.

Investors who lost money at Gowganda blame the mining industry for the loss. The Government blames the industry for the destruction of the forests. But, as I have shown, the responsibility for both rests squarely on the shoulders of the Government.

Yours, etc.,

L. O. HEDLUND.

Gowganda, February 15th, 1919.

MINING NEWS FROM THE PAS.

The Pas, Feb. 14.—The Cameron-McKay group of eight claims on the east arm of Athapapnskow lake are being developed. Messrs. McKay and McFarland, of Regina, and nine men, went north last week with a full camp equipment. The showings on these claims are considered promising, and warrant vigorous investigation. A dyke of 42 to 70 feet wide has been located. Strong indications of copper sulphides are present.

Morgan has 175 teams hauling copper ore from the Mandy mine. The amount hauled is stated to be 6,000 tons so far.

Monday's Tamarack took a small body of prospectors to Hudson Bay Junction, to stake claims for oil and gas. Frank Moore says the indications are strong and samples of shale have shown high contents of oil. The place is about 80 miles south of The Pas.

The mining recording office remains in The Pas, and great satisfaction is felt everywhere. Mining Recorder F. Barker was so advised on Wednesday. It was intended to remove this office to Dauphin, but upon representations of The Pas Board of Trade, J. A. Campbell, M.P., Mayor Finger, Professor Wallace, Mandy Mining Company, J. W. Callinan and many others, the intention was abandoned. The office now remains here in the centre of mining.

The advice of Mr. Barker was that The Pas will remain a full mining recording office, with all books and documents retained here, and in this way things will go on as before. The rearrangement, therefore, makes The Pas a sub-agency for lands, and a full agency for mining claims and matters connected thereto.

To bring this desirable end about, it was necessary for all interests in the Northland to unite, as they did, and protest vigorously against removing the office. The Board of Trade took the lead, and the success of the movement establishes the board's right to command the interest and support of all. Telegrams of thanks were sent to Hon. Mr. Meighen. — The Pas Herald.

Instruction by Correspondence for Miners

Arrangements have been made by Hon. Wm. Sloan, Minister of Mines, and Hon. Dr. MacLean, Minister of Education, for the establishment of a system of instruction by means of correspondence which will give all miners who are British subjects and resident in British Columbia an opportunity to qualify for positions of trust and responsibility in connection with their chosen vocation.

In making this announcement it is pointed out that for some years the Department of Education has been conducting night schools for the benefit of men engaged in the mining industry with a view to providing that instruction which is necessary for thorough preparation for the examinations set by the Department of Mines for those aspiring to important charges in connection with the operation of mines.

The conditions of the shift system under which miners work heretofore has mitigated against that pronounced success which is so much desired by both the Mines and Education Departments and, in order to overcome this difficulty and to bring the opportunities of study within reach of a greater number of men the decision has been reached to conduct the classes and disseminate the required knowledge through the medium of correspondence. It is considered as probable, although no definite statement has been authorized as yet, that the correspondence will be augmented by personal visits on the part of instructors to the various sections of the Province for the purpose of giving at intervals such guidance and assistance to students as, perhaps, may not readily be obtained through the mail.

It is explained that, not only will those subjects be covered in which a mastery is necessary before British Columbia papers as shotlighters, overmen and mine-managers can be obtained, but a preparatory course also will be given. As the examinations referred to, which are conducted by the Mines Department, are only open to men not less than twenty-three years of age, it is proposed to provide means of study for youths between the ages of 14 and 23. If the years intervening between the time of attendance at day-school and the time when the young man is eligible to sit for his first test be wisely spent, the faculty for acquiring knowledge will be prevented from becoming dulled, the receptivity of mind being preserved. This, it is considered, will furnish the opportunity by which boys fresh from school may persistently and patiently pursue those studies which will lead them successfully to the final examinations.

It is felt that this change in the present system will be generally appreciated, having the effect of placing within the convenient reach of everyone interested the means of securing that training necessary for advancement. That the young men who take advantage of the course will be well rewarded is assured, as there is no question as to the benefits of the study-habit inculcated during adolescence and matured in adult manhood.

It is interesting, in this connection, to outline some of the courses proposed. Those of most importance are prescribed for the first year (preparatory), and fourth, fifth and sixth years. They follow:

First Year.

Preparatory work for boys and young men over fourteen years of age. Pupils should have a pair of compasses, a pair of dividers, a protractor, two set-squares, a T-square, and accurate ruler graduated in inches and centimetres.

Arithmetic—Vulgar and decimal fractions; short methods of obtaining approximations; practical applications; square root; proportion, simple and compound; proportion expressed in a form of simple equation.

Mensuration—Measurement of lines; scales; use of compasses, dividers, set-squares, T-square; areas—rectangular, triangular, and circular areas; area of eclipse.

Drawing—Meaning of plan, elevation, section. Type-models—prism, cube, etc., to be draughted, and cut out of stout paper; plans, elevations, and sections to be drawn from them.

English—Penmanship; spelling; grammatical errors; letter-writing; personal and business composition; simple descriptions and narration relating to mines and mine operating; encouragement of home-reading.

Text-books—The Black Diamond Reader (Nelson) (a primer of coal-mining); the Fifth Reader; Arithmetic, Book III. (Milne); Drawing Book IVa. Books to be obtained from the Free Text-book Department on application.

These books should not be taken from the school-room, but may be purchased from the teacher. Fifth Reader, 50 cents; Third Arithmetic, 45 cents.

Fourth Year.

Course for the Fireboss, Shiftboss, or Shotlighter's Certificate (Third Class.)

Candidates must have at least three years' practical experience, be at least twenty-three years of age, and hold a First-aid Certificate.

Mining Arithmetic—First four rules of arithmetic; vulgar fractions; decimal system of notation; decimal fractions; percentage and simple interest; square root; simple ratio; proportion and variation.

Drawing—Scales; measurement of simple figures; the triangle; square and rectangle.

Metric System—Measurements by metric scales; simple tables of British and metric units.

Mensuration—Area of regular figures; the triangle, square, circle, and ellipse; area of irregular figures by Simpson's Rule; squared paper, use of squared paper, some simple graphs, and their practical applications.

Gases—Practical instruction in the properties of mine gases and in the means of their detection.

Theory of Mining—Composition of air; determination of the volume of the residual gas after removal of the oxygen by phosphorus; properties of the residual gas; preparation and properties of the following gases; oxygen, nitrogen, hydrogen, marsh-gas, hydrogen sulphide, carbon dioxide, and carbon monoxide; explosive mixture of fire-damp and of hydrogen with air and with oxygen; the effects on the intensity of the explosion due to increasing the percentage of either gas; experiments on the passage of flame through long glass tubes of various diameters; the propagation of the explosive wave; circumstances under which the several noxious gases are met with in mines; means of detection and removal; gaseous diffusion; its importance to the miner; atmospheric pressure; the barometer effects of changes of atmospheric pressure on the issue of noxious gases in mines; observations of the flame "caps" produced on several types of safety-lamps by known percentages of fire-damp; testing for carbon monoxide with the Simonis apparatus; blood test for carbon mon-

oxide; practical lessons in the measurement of an air-current by means of the anemometer; coal-dust, danger of; experiments with Vital's apparatus; shot-firing; mining explosives; duties and responsibilities of a mine fireman; how to make a report of an inspection.

The "Mining Act" and rules of the mine.

Fifth Year.

Course of Work for the Overman's Certificate (Second Class.)

Conditions.—Have at least five years' practical experience; be at least twenty-three years of age; hold a First-aid Certificate.

Shaft-sinking—Drainage; tests, theories, ventilation; principles of the fans; duplicate and auxiliary fans.

Colliery Explosions— Historical review; coal-dust; rescue-work and apparatus; methods of testing fire-damp; removal of accumulation.

Lighting—Safety-lamps, various types; cleaning, lighting, locking and relighting; flame and electric; handling and examining; regulations regarding safety-lamps.

Methods of Working—Shaft pillars, laying out; positions, number, inclination of main roads, pillar and stall; long-wall methods, working of various seams, roof-control, supports, boring, shot-firing, ventilation; distribution and control of air.

Transmission of Power—By steam, disadvantages of steam, steam-pipes, traps, expansive joints, condensers and condensation; by compressed air; by electricity, hydraulic power, the oil-engine; mechanical haulage.

Technical Electricity and its Uses for Safety—Properties of magnets, magnetic induction; lines of force, electrical currents, electric magnets, electric bells electrolysis, current measurement, Ohm's Law; measurement of resistance; Wheatstone's bridge; ammeters; voltmeters; wattmeters; direct currents; wiring circuits; dynamos and motors; alternating currents; the "Mining Act" and rules of the mine; duties of the various men.

Mathematical Calculations—Mining formulae; logarithms; use of squared paper, trigonometry.

Sixth Year.

Cover-Work for Mine Manager's Certificate (First Class.)

Conditions.—Be a British subject; have at least five years' practical experience; be at least twenty-five years of age; hold a First-aid Certificate.

Geology of Coal—Origin, varieties, stratified rocks, outcrop; strike and dip of bed; igneous rocks; coal-beds and mineral veins, rolls; faults; rules for finding continuation of seam beyond faults; cleavage of rock; cleat; lype, and reed of coal.

Shaft-sinking—Drifts, slopes, and shafts; surface arrangements; supplies, precautions, timbering; Kind-Chaudron method and modifications; Pattberg and hydraulic methods; sinking through running ground by piling and spiling; Caisson sinking; Triger's and Poetsch's methods.

Methods of Working Coal.—Laying out pit-bottoms; size of shaft pillar; direction of main roads; tools and appliances used underground; boring and drilling machines; pick and undercutting machines; power used; considerations of thickness and inclination of seam; liability to spontaneous combustion; faults; conditions of roof; depth of working; supporting excavations, effect of thrust and creep; methods of timbering.

Hoisting and Haulage—Geared hoisting-engines; direct- and alternating-current hoists; ropes; size of engine for output; engine foundations and specifications; hoist indicators; drums and reels, rope wheels and fastenings; clutches; brakes; sheaves; skips and cages; buckets; car-locks; car-guides; landing-fans; head-frame; signalling.

Mine Drainage—Surface and underground drainage; fault and inclined deposits above and below water-level; tapping and draining abandoned workings; mine-dams; siphons; water-hoisting; hoisting *versus* pumping water.

Ventilation, Theory, and Practice—Properties of gases; behaviour and detection of mine gases; fire-damp, after-damp, ignition of gases; mine explosions; prevention of explosions; brushing gas out of pockets and old workings; sealing off fires; precautions in approaching old workings; form and size of airways for ventilation; measuring velocity of air and ventilating pressure; natural ventilation, furnace ventilation, types of fans, fan-installation doors; principles of fan design; fans of the propeller type; secondary ventilation, installation of auxiliary fans; regulators, brattice, air-crossings, stoppings, air-splitting.

Lighting—Lighting of pit-bottom; naked lights; forms of safety-lamps; cleaning, lighting, locking, and relighting; flame and electric lamps; fire-damp indicators; regulations regarding safety-lamps.

Surveying—Practical geometry and trigonometry, properties of angles, triangles, and common plane figures, logarithms, areas, construction and reading of verniers; surveying with chain alone; construction, adjustment, and proper use of compass, level, transit, etc.; surveying with the transit, forms and field-notes, levelling; connection of surface with underground surveys; putting on lights; methods of keeping underground notes.

Mechanics—Definitions and illustrations of force, mass, weight, motion, kinetic and potential energy, momentum, equilibrium, centrifugal force, law of conservation of energy; forms of energy, representation of forces, levers, transmission of power by pulleys and belts; by rope drive; laws of friction, co-efficient of friction; steam and compressed air.

Boilers—Various types, Cornish, Lancashire, and Galloway; water-tube boilers, Babcock and Wilcox, Heine, Stirling; boiler construction and testing.

Steam-engine—Properties of steam; types of valves; operation and care of engine; steam connections; condensers.

Air-compressors—Construction of air-cylinders, pistons, and valves; single and duplex, simple and compound compressors; isothermal and adiabatic laws; energy losses; Rearell's hot transmission system; compressed-air locomotives; compressed-air drills and coal-cutters.

Pumps—Simple hydraulics, static head, calculation of flow of liquid through pipes; siphon; types of pumps, calculation of horse-power; setting up pumps; packing; priming; their operation and care.

Electricity—Relative advantages of direct and alternating current for mining purposes; mining switch-gear; transformers and transformer stations; voltage regulations; load diagrams; application of electric power to machine-driving in mines; specifications of mining motors; rating; plate and other protection; upkeep of electrical plant; electric winding, Siemens-Ilgner and Westinghouse systems.

Preparation of Coke—Suitable coals; principles involved in coking; coke-making in bee-hive and retort ovens; nature of by-products and their recovery.

Laws relating to coal-mining in British Columbia.

Market Conditions

A Recently Issued Statement of the N. S. Bureau of Mines Contains the Following Comments on Market Conditions:

Pyrite and Sulphur.

The pyrite and sulphur industries of the United States are now in a transition stage from a war to a peace basis, and as a result there is considerable dislocation of the industry, owing primarily to the uncertainties of the markets, and the prices that may prevail. The cessation of hostilities and the abrogation of war contracts found the large consumers of pyrite and sulphur with large reserves on hand, and naturally, until these reserves are absorbed the demand for new material will be greatly curtailed.

Another consideration is that many of the acid manufacturers, especially those engaged in the manufacture of fertilizers, are not anxious, at this time, to enter into any new contracts for either pyrite or sulphur, anticipating that the present prices of these products will be materially lower in the course of the next few months.

The high rates of 35 to 40 shillings per ton on Spanish pyrite, which prevailed during 1918, have been substantially reduced since the close of the war, and recently rates as low as 20 shillings per ton have been quoted. The pre-war rates ranged from 8 to 10 shillings, but it is not likely that these low rates will again prevail for some time to come.

During 1918, the price of imported pyrite delivered at Atlantic ports varied widely, depending largely on ocean rates. The prices varied from 25 to 35 cents per unit of sulphur, with an average of perhaps 30 cents. A recent quotation at New York is 16½ cents per unit, on the basis of a 10 shilling ocean freight.

Graphite.

The U. S. War Trade Board has removed all restrictions on graphite importations, notwithstanding the recommendation of the Director of the Bureau of Mines to continue them until July, 1919. The French Government has authorized the export of 1,500 tons of graphite from Madagascar to the United States during the first half of 1919. Some weeks ago 1,000 to 1,500 tons was offered f.o.b. Madagascar at 5½ cents per pound. Large stocks exist in France.

Copper.

There appear to be considerable stocks of both refined and blister copper. There is no free market for the metal, the price fixed by the United States Government being no longer operative and selling conditions are consequently unstable. There was recently announced the personnel of a commission which proposed going abroad for the purpose of surveying the foreign copper market and if possible negotiating sales. This commission is composed of men representing the large producers.

Since the signing of the armistice curtailment of production by all the large mines has been in order and recent reports are to the effect that Anaconda is running at a 40 per cent curtailment. The position of Anaconda is a pretty good barometer of the other large domestic producers. The cost of producing copper has risen materially in the past eighteen months owing to the increase in wages and supplies, decreased efficiency of the men, and general disorganization arising out of war conditions.

Magnesite.

The United States production of magnesite prior to 1915 (back to 1909), amounted annually to about 10,000 short tons. The domestic production in California greatly increased with the cutting off of supplies from abroad which came principally from Austria and Greece. Washington began to produce late in 1916 and since that time production in that State has increased rapidly. In 1917 the total production from California and Washington was 317,000 tons, and it is estimated that it will be about 225,000 tons in 1918. Increased freight rates, shortage of cars which reduced the demand by hindering deliveries, shortage of labor, restricted building operations, increased importation of Canadian magnesite, and the use of dead burned dolomite are the main reasons for the decreased production in 1918.

The magnesite industry, owing to the use of the mineral as an accessory in making steel and copper, has been considered a war mineral. Because of its importance, the domestic industry deserves close attention at this time to tide it over what may be for it an emergency period. It is said that certain of the large companies, through their control of distribution and consumption, have sufficient stocks on hand to meet domestic requirements until well into the present year, after which they expect to begin importing from their own deposits abroad.

All import restrictions have been removed. It is reported that magnesite is permitted by the Italian Government to leave Trieste, if destined for the United States. The stocks in Trieste are not definitely known, but the presumption is strong that there are several thousand tons there and possibly stocks at other European ports as well.

Several of the consumers of domestic magnesite have, during the past year, expressed themselves as satisfied with the domestic material but afraid that with the return to normal conditions American magnesite may not be able to compete with the foreign article. Foreign labor is cheap, and this mineral comes over at low rates. The principal centres of consumption are nearer the Eastern seaboard than are the Western sources of supply. High freights may prove disastrous to the domestic industry.

Potash.

A serious crisis developed in the potash industry during January. Recent estimates indicate that about 100,000 tons, gross weight (equivalent to 25,000 tons K_2O), of potash salts produced in the United States during 1918 is still in the hands of the producers, who apparently can find no market for their product. The larger part of this material has come from the Nebraska lakes.

The explanation of this situation lies largely in the high war prices which have been about $4 per unit. The farmers are not buying potash salts except to a small extent, apparently in the hope that prices will drop before spring, or with the intention of not using potash until next fall. Unless the market improves quickly the potash can not be sold in time for manufacture and use for this spring's crops of cotton, wheat, potatoes and truck.

The potash producers report that inquiries were just beginning to come in for potash when Chairman E. N. Hurley, of the Shipping Board, made his announcement that tonnage would be available for the immediate import of Alsatian potash. This statement caused the market for domestic potash to disappear almost en-

tirely. The matter was taken up by the War Trade Board through its foreign representatives with the result that on January 25 the following statement appeared as public announcement in the Commerce Reports:—

"The War Trade Board announces that it has received authentic and official information from the French High Commission in the United States to the effect that France will be unable, at least until April, to ship potash from the potash mines of Alsace. These advices further indicate that for the next few months practically the entire potash output of the Alsatian mines will be urgently required for agricultural purposes in France. It is the view of the War Trade Board, based upon this information, that even under the most favorable circumstances, no potash from Alsace could be available in the United States for agricultural uses before June, 1919, and that, therefore, it will be necessary that the United States rely entirely upon its domestic production for the coming season."

Chrome.

The production of chrome ore is at low ebb and while there are no market quotations, there are a few shipments presumably upon existing contracts.

Ferrochrome is not quoted in market reports; there are, however, some movements of stocks of ore and alloy. On January 19, ferrochrome was selling for 40 cents per pound.

Lead and Zinc.

During the world war political jurisdiction was rather generally invoked in the allied countries to restore control of national resources and industries to citizens of a given country or its allies. This movement was particularly marked in the British Empire wherein there now exists an extremely centralized joint political and commercial control of the zinc industry in particular, based on the large production of zinc concentrates in Australia and expected production in Burma. In Australia, Tasmania, India, and the British Isles there has been Governmental participation in the producers' and sales organizations, and in the financing of power and smelting equipment.

In France this movement has taken the form of "consortiums" or associations of the principal factors in each industry, recognized by the Government and made the arbiters of all questions affecting their particular industry. The consortium of the mineral industry has been perfected into the "Societe Mineraux et Metaux," 154 Boulevard Haussmann, Paris. The official announcement states that this Society is organized under the auspices of the French Government in order to group the French metal producers operating both at home and abroad into a co-operative association for the purchase and sale of metals and metallurgical products.

The mining and metallurgical companies participating in the society comprise the principal companies in France producing or refining metals and also the lead, zinc, copper, iron, and smelting companies controlled by French capital in Spain, Algeria, Tunis, Mexico, and Peru. Thus, there is brought about a highly centralized organization of that portion of the mining and metal industry under French control for mutual protection and advantage in competition with other nationalities. This development is worthy of special note by everyone interested in the mineral industry.

The present annual output of the companies participating in the Society is about 200,000 metric tons of lead, 50,000 metric tons of zinc, and 40,000 metric tons of copper.

WILL ADOPT WHITLEY SYSTEM FOR MINES.

London, February 21.—The Mining Association of Great Britain, which comprises all the leading colliery owners, according to the Evening Standard, has decided to invite the formation of joint councils of miners and employers to manage mines in certain defined districts. These joint councils would arrange and fix the standard of wages, labor costs, management and interest on capital. The miners also would be brought into intimate contact with all problems relating to selling prices and costs.

At a conference of Government officials and representatives of a number of trades unions held to discuss the application of the Whitley system to Government establishments, the Minister of Labor declared that the Government was ready to apply the system giving workmen a share of the management in all Government workshops and yards. The object of the scheme is to ensure grievances being handled immediately they arise, thus preventing a strike and securing harmony in the industry.

A committee representing the engineering, shipbuilding and other trades was appointed to draft a constitution for the proposed Whitley councils.

The Miners' Federation has decided to accept the invitation to attend the industrial conference which the Government has called for February 27. It has decided also to communicate with Premier Lloyd George and inform him that the executive committee has not passed any resolution concerning the proposed miners' strike on the lines recommended by him, but will leave it to the delegates to the miners' conference to arrive at a decision.

NOVA SCOTIA MINERS AND OPERATORS CONFER.

Sydney, N.S., Feb. 21.—Closing one of the most harmonious sessions ever held between operators of the coal areas of Cape Breton and their employes last night two of the three concessions asked for by the workers were granted.

These were for permission to affiliate with the United Mine Workers of America and the granting of an eight-hour day for the underground workers of the mines. The third item in the routine business for discussion was that of wages, but as most of the associations are under contracts with the operators for a time yet this matter was not taken up seriously, only with a view of paving the way for the discussion which will come after these contracts have expired. Mr. Fergie, Mr. Tonge, Mr. Grey and other of the officials when questioned about the conference, stated that they had never attended a session where the spirit of good-will and tolerance was so manifest. There were many tangles to be unravelled and to be discussed, but while each side presented their respective cases with decision there was no actual ill-feeling and both sides are satisfied with their conclusion.

Special Correspondence

NORTHERN ONTARIO.

Increasing Activity in Boston Creek Gold Area.

Activity in the Boston Creek district is increasing, and large numbers of claim owners are making arrangements for the aggressive development of their properties during the coming spring and summer months. Preliminary arrangements are under consideration for the building of a light railway from Boston Creek station to the Miller-Independence mines. At the same time the government is being asked to construct a good wagon road from the station at Boston Creek to the centre of activity.

The shaft on the Allied Gold Mines property has reached a depth of 50-ft., and it is planned to continue this working to a depth of 100-ft. immediately. With this end in view additional men are being employed. Developments up to the present point of operation have been very satisfactory. Arrangements are being made at this latter property for the installation of an electric mining plant in the spring.

Will Develop Crawford Property.

A deal for the Crawford property in the Skead township section has just been completed. These claims are located next to the Costello group, on which spectacular showings of gold have been found. More or less energetic development has been under way in the district for the past two years. The purchasers of the Crawford claims anticipate commencing operations as soon as possible. The general outlook for this section of the gold area is very promising at the present time, and, in addition to considerable development now in progress, several other mining companies and private property owners are making arrangements for doing further work.

Will Install Plant at Chaput-Hughes Property.

Active mining operations have been commenced on the property of the Chaput-Hughes Mines, in the Kirkland Lake district. Ore broken in the first few shots is said to be of a commercial grade. A shaft has been sunk on the north-east corner of the property on a strong and well mineralized vein which can be traced the full width of the claim. A small mining plant will be installed on the property as soon as possible.

Developing Rich Ore at Bourkes Mine.

Rich ore is being developed in a shoot on the west drift of the Bourkes Mines at the 100 and 200-ft. levels. A winze is being put down from the 200-ft. level and the values are proving consistent in this working. Although the high grade ore at this property in the past has not proven altogether consistent, the present orebody is standing up well under development. The property is situated at Bourkes Siding on the T. & N. O. Ry. A number of other prospects in the vicinity will receive further development when the snow has left the ground.

Alexo Nickel Ore Shipments.

During the first week of the current month the Alexo mine at Porquois Junction shipped three carloads of ore containing approximately 280,000 pounds. This makes a total of about 680,000 pounds so far this month and it is estimated the mine will product about a million and a quarter pounds of ore for the present month. The ore is shipped direct from the property to the smelter at Coniston.

10 Tons Ore From Foster Netted $90,000.

The operators of the lease on the Foster property at Cobalt are prosecuting development work at the 60-ft. level of the mine for the purpose of cutting a number of veins which are known to parallel the one in which the rich ore shoot was recently encountered. It is now learned that the value of the recent shipment of ten tons of ore from this rich shoot netted the leasees between $90,000 and $95,000, which shows a silver content of upwards of 9,000 ounces to the ton. The possibilities of opening up other valuable ore shoots are considered good, while a considerable amount of good grade ore has been mined at the property in taking out the high grade shoot.

Stoping Ore at Adanac.

The stope recently started at the 310-ft. level of the Adanac property has been put up about fifteen feet and the ore being encountered continues rich in silver. A considerable quantity of this is of sufficiently high grade to make bagging necessary and this is taking place in the working. Additional shipments of high grade as well as medium grade ore will be sent out in due course. Additional working forces have been taken on at the property and the work is being speeded up.

Ore Sampling Plant at Cobalt.

Efforts are under way to have the ore sampling plant of Campbell & Deyell, at Cobalt, which has announced its intention of discontinuing operations early in March, supported by either the Federal or Provincial Government. This is the only customs sampling plant in the large mining district of Northern Ontario, in fact, so far as known it is the only one doing a solely customs business in the Dominion. Its value to the mining industry generally can hardly be over-estimated, and the suspension of operations by the concern would be a serious blow to the industry throughout the whole north country, causing no end of inconvenience and delay in estimating the returns of ore which is now sampled by this concern previous to treatment in the various smelters. The value of the plant to mines in the prospective stages of development where small test runs of ore are required is also of the utmost importance. Thus energetic measures are being taken to encourage the continuance of the plant's operation.

Wettlaufer.

According to the terms of the agreement between the Wettlaufer and Pittsburg-Lorrain Mining companies of South Lorrain, the latter company is obliged to resume work on the Wettlaufer property about the end of next month, provided the terms of lease now in force are complied with. It is understood the two companies are bearing an equal portion of the light expenses incurred while the plant is not in operation. During the year 1918 the mine and mill of the Wettlaufer were operated more or less satisfactorily under lease to the Pittsburg-Lorrain. At the present time there are no operating mines in this once busy section of the country.

Trethewey.

The annual report of the Trethewey Silver-Cobalt Mines for the year 1918 shows a net value of production of $250,534. As the operating cost was $147,166, net operating profits amounted to $103,368. Dealing with the physical condition of the mine, the report

says: "The productive area of the property comprises less than six acres, which is limited by the Keewatin formation to a depth of 250-ft. Up to the end of 1917 a total of 25,639 ft. of development work had been done, confined almost entirely to the above-mentioned area, leaving no territory where development could be carried on with promise. Consequently no development work has been done during the past year. The ore reserves at the end of 1918 show a decrease of 2,428 tons as compared to 1917. Blocked ore increased 1,581 tons, while broken ore increased 4,009 tons, the net decrease in tonnage amounting to 12 per cent. The estimated ounces of silver in the ore reserves decreased from 264,044 to 159,172, a decrease of 104,872 ounces, or 39 per cent. A total of 24,614 tons of ore was broken in the stopes at a cost of $54,268.26, or $2,21 per ton. As in the preceding years the ore was broken from the walls of old stopes and was of a very low grade, only the favorable price of silver, making possible the extraction of this silver at a profit. The revenue account showed that $135,748 had been carried forward from the previous year. This with the year's profits and $1,751 from readjustment, brought the total for approporiations to $244,372. Depreciation took $39,376, dividend (5 per cent) $50,000, reserve for taxes $3,604, leaving an increased balance to carry forward into the current year of $150,391.

The Trethewey company has taken up 370,000 shares of the Castle Mining Company's stock and the balance sheet shows $78,230 spent on the property. Current assets stood at $171,600, as against current liabilities of $20,000. The oil flotation parts were delivered late in the year, but operations from October forward showed a profit of $1.50 per ton. As there are 58,000 tons of dump the company expects to recover a nice profit from reclaiming operations.

Dealing with the Castle property in Gowganda, the report says: "The installation of machinery on the Castle property was completed in June. The plant consists of two boilers having a combined capacity of 110-h.p., a 360-720 straight line compressor, and an 8 x 10 hoist, pumps, etc.; the equipment being entirely suitable for the proposed development. The shaft reached a depth of 310-ft. in October, labor shortage causing serious delays. During November and December lateral work was carried on both the 200 and 300-ft. levels. Several promising veins were encountered, but none of them were followed up, the policy being to drive to the contact first. From what information it has been possible to gather best results will be obtained near the contact. Therefore, the work during the early part of 1919 is looked forward to with considerable expectation. The general geological conditions to date have been of a nature most favorable to the deposition of ore." Since the foregoing report was compiled, some very encouraging developments have taken place at the Castle property.

Porcupine Crown Plans Diamond Drilling.

According to advice to hand this week it is the intention of the Porcupine Crown Mining company to carry on extensive diamond drilling operations on their property. The known ore reserves of the property at the present time are estimated at $500,000, and it is generally expected that these will be considerably augmented. The main workings of the mine have been carried to a depth of 1,100-ft., and it is estimated that this ore body will persist on the Porcupine Crown to a depth of perhaps 1,400-ft. The mill on the property is one of the most efficient in the country and within a comparatively short time should be producing large profits. The company began the year 1919 with a credit balance of $271,955. It has been decided to recommence milling operations as soon as possible, and it is altogether probable that net earnings will soon be ample to resume dividend disbursements at the former rate of 12 per cent per annum, without drawing on the present substantial cash surplus.

Hollinger Increasing Production.

The Hollinger-Consolidated Gold Mines of Porcupine is reported to be increasing the production of the mill during the past week. This indicates that the production will probably be in excess of half a million dollars monthly, and should permit of profits in excess of $246,000 per month. The consensus of opinion in the north country is that the Hollinger-Consolidated will soon resume its regular disbursement of 13 per cent per annum, with fair promise of even this rate being exceeded, perhaps, by the beginning of another new year. The resumption of construction work, including the construction of a large number of new houses for the employes will be rushed through at once.

Will De-Water Schumacher Mine.

Arrangements are being made for the de-watering of the Schumacher mine, preparatory to a resumption of operations at the property. The Schumacher has been developed to a depth of 700-ft. and the mill on the property is the fourth largest in the gold camp. The company is well financed, having a surplus of around $80,000 and having authorized the sale of 100,000 shares of treasury stock at not less than 45 cents per share. This, taken together with the operation of the 180-ton mill, will allow for the continuation of the main shaft to a depth of 1,00-ft., as well as the increasing of the mill from 200 to 300 tons' capacity per day.

Mill Additions for Davidson.

A number of additions have been made to the milling equipment of the Davidson gold mining company at Porcupine. These enlargements are said to have been made necessary by the opening up of large orebodies at the 500-ft. level of the property. During the installation of the new equipment it was necessary to close down the pumps for a time, which permitted a quantity of water to accumulate in the workings. These are now being de-watered. When this work is completed energetic efforts will be made in the development of the new orebodies recently located at the 500-ft. level of the property, from which the management expects important results.

Sinking Shaft on Ontario-Kirkland.

After considerable delay in securing electric power the Ontario-Kirkland Mining Company has at last commenced its extensive plans of development, and the shaft on the property is being sunk to a depth of 300-ft. Ample funds are said to be in the treasury for the carrying out of 1,500-ft. of underground work which will be done in drifting on the main vein and cutting parallel veins at the 300-ft. level of the property. Judging by the assay reports on the veins uncovered on the surface of the property, the Ontario-Kirkland is a property of considerable merit, and the development of these ore bodies at depth means much to this section of the Kirkland Lake gold area. The veins on the surface are wide and remarkably consistent in value.

Proposes a 44 Hour Week.

A Bill has been introduced to the British Columbia Legislature providing for the application of a 44-hour week to all industrial workers of British Columbia. Its sponsor is Mr. James Hawthornwaite, the member for Ladysmith, B.C. There are on the statute books of British Columbia two Acts passed in 1918 through the instrumentality of Hon. Wm. Sloan, Minister of Mines. One sets the hours of labor for all employed above ground in connection with coal mines of this Province at eight hours, thus placing this class of employee on the same basis as underground workers, except that the latter's working day begins the moment they leave the surface. The other gives miners engaged in metalliferous mines, above or below ground, the eight-hour day. Both these enactments are effective on the 31st of March, 1919. If Mr. Hawthornwaite's measure is endorsed, therefore, it means that, in addition to the eight-hour day, the miners of British Columbia will have a half holiday on Saturday.

Control of Coal Prices in B. C. Has Ceased.

Mr. C. A. Magrath, Fuel Controller for Canada, has announced that the control of coal prices in British Columbia by the department of which he is the head ceased on the 11th February last. The collieries of the West, therefore, are put back on the old competitive basis. They once more are in a position to make their own prices, based on their own estimates of cost of production. That costs vary materially on the Vancouver Island was strikingly proved when, as a result of a close investigation, the Fuel Controller authorized all collieries of the district to increase their sale prices to a certain figure, excepting only the Canadian Western Fuel Company. It will be interesting, therefore, to watch developments, the controlling hand of Government being withdrawn.

In making known the determination of the Fuel Control Department as stated, Mr. Magrath explains that the United States Government abandoned control of prices at the mines on the 31st January. He explains that the reasons influencing his action are that the country's war activities, calling for greater and still greater quantities of coal for war industries, are at an end; that an exceedingly mild winter is being enjoyed in Canada, considerably reducing even normal demands for coal; and that the early return from Europe of many of those that formerly worked in coal mines should make easier the maintenance of production.

Addressing the western operators, he says:

"This great conflict through which we have passed has been a time of stress in mining operations, but I have reason to believe that between miners and operators in Canada, there now exists a far better understanding than in pre-war times. That is my experience in the adjustment of their differences in the Maritime Provinces. I have not had the same intimate relations with the industry in British Columbia, for the reason that in your district my official powers did not include such adjustments.

"As to the future, I have full confidence that both you and your employees fully appreciate your combined responsibilities to the country and that whenever differences arise you will frankly and openly meet each other in a spirit of fairness.

Carbondale and Coleman Miners Want Political Prisoners Released.

Conditions in the coal mining camps of parts of the Province of Alberta and Eastern British Columbia reflect, in a minor sense, the unrest prevalent in labor circles of Great Britain at present. This is indicated by the proceedings at a recent joint meeting of the local unions of Carbondale and Coleman, U. M. W. of A., Alberta, called for the purpose of hearing the report of delegates to the Alberta Federation of Labor Convention and also discuss a circular asking that the unions support a protest against the continued incarceration of political prisoners.

The debate on the latter subject resulted in the passage of the following resolution:

"What we endorse the action taken by the Alberta Federation of Labor Convention at Medicine Hat, demanding the release of all political prisoners, incarcerated during the war, and are ready to fall in line with any action the Executive of the A. F. of Labor may take, NO MATTER HOW DRASTIC, to attain that end."

Strong comment is reported to have been caused by the report of the arrest and conviction of Thomas Shannon, secretary for Diamond City Local, for having in his possession banned literature and other correspondence in connection with the Local. It was argued that if such a state of things were allowed to exist, all secretaries for organized bodies would be placed in a precarious position and liable to arrest at any time.

The following resolution was carried:

"Unanimously resolved that we urge upon all Locals in the District to take immediate action in this matter, fix a date as early as possible, and all cease work until Bro. Thom Shannon is released from prison."

The resolution passed in convention at Medicine Hat demanding free speech, free assembly, and the ban entirely lifted from all literature was also endorsed.

No Russian Coal Miners Needed.

Considerable feeling was created recently in some British Columbia and Alberta coal mining centres through a report that operators were arranging for the importation of Russian coal miners in order to enable the fullest possible development of the mines of the districts affected. The rumor was denied at the time, but it persisted and was taken up with the Department of Labor, Ottawa. The result is the following explanatory letter from Hon. G. D. Robertson, Minister of Labor, flatly refuting the statement:

Ottawa, Ont., Dec. 14, 1918.

W. F. McNeil,
1015 Herald Bldg.,
Calgary, Alta.

Your letter December 10th. On November 11th the Department received notice that the Canadian Pacific Railway Company was negotiating with the Western Coal Operators' Association respecting the importation of four hundred Russian miners and that several of the Western mines were not then working to full capacity through lack of orders. My wire of November 11th stated that inquiry was being made immediately respecting the supply and demand for miners. That inquiry confirmed the statement that mines were not fully occupied through lack of orders, that there was no necessity of importing Russian miners. The Canadian Pacific Railway Company was accordingly

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Take the Pacific Mills, Ocean Falls, B.C. Their conveyor job is to handle 45 tons of pea coal per hour over a distance of 476 feet. The conveyor runs level for 311 feet, and rises 30 feet in the remaining 165 feet. Motor 20 h.p. Head pulley 36 inches. Tail pulley 30 inches. Speed 285 feet per minute. Top rolls 6 feet apart. Return rolls 10 feet apart. Return rolls 10 feet apart. Not a big belt problem. But a place where the conveyor belt must give long, economical service.

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GOODYEAR

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asked to discontinue any negotiations in this connection. Subsequently the railway advised that there had been no negotiations in progress, which fact was later substantiated from other sources. Your letter indicates that an utterly incorrect interpretation was placed upon the telegrams exchanged.

G. D. ROBERTSON,
Minister of Labor.

B. C. Chamber of Mines.

Vancouver, B.C.—The Vancouver Chamber of Mines has decided to change its name to that of the "British Columbia Chamber of Mines." This step has been agreed to in order that the influence of the organization may be extended to include the whole province. At the last election of officers a selection was made of some representative mining men outside of Vancouver, it being felt that, if the Chamber of Mines is to make its work beneficial to the industry of British Columbia, it must be understood to be a body belonging, not to any particular locality or community, but to the whole of the province and pledged to advance, wherever possible, the interest of all or any of its districts. Good progress is being made in preparations for the International Mining Convention to be held in March and the effect of which, it is hoped, will be the creation of a complete understanding between the mining men of Western Canada and the Western States and generally the engendering of a spirit of healthy optimism.

To Manufacturers

Valuable economic minerals, of which the people of this country as a rule have little knowledge, are distributed in various sections served by the Canadian National Railways. The field of utility for these minerals is constantly expanding and entering more and more into the realm of manufacture.

Information on this subject can be obtained by writing:—

The Industrial and Resources Department Canadian National Railways

TORONTO :: ONTARIO

THE LATE JAS. CUMMING,
A Pioneer of Cariboo, B.C.

Granby.

An unconfirmed report is in circulation to the effect that the Granby Consolidated Mining & Smelting Co. proposes suspending operations at its Grand Forks, B.C., smeltery. The statement emanates from New York and is creating some uneasiness in the Boundary District of the Province, which already has been somewhat seriously affected by the closing down of the Canada Copper Corporation's plant at Greenwood, B.C. Those on the ground, however, are hopeful that no definite decision of the character indicated has been reached. They point out that the company has other properties which might contribute to the smelter, among them being the Velvet, near Rossland, B.C. on, which considerable development has been done.

Ore Receipts at Trail.

The month of January established the best record for some time in point of ore receipts at the Trail Smeltery of the Consolidated Mining & Smelting Co. of Canada. A total of over 35,000 tons of ore and concentrates were unloaded at Trail in that period. Forty mines shipped to Trail in January, four being located in the United States, one in the Yukon, one in Manitoba and the balance in British Columbia.

UNITED MINE WORKERS AT CALGARY.

It was stated at the annual convention of District 18, United Mine Workers of America, which is being held at Calgary, Alberta, that there are 2,000 miners in the district without work, and that 3,000 others are only working part of the time. The seriousness of this situation, it was said, became accentuated when it was remembered that the slack time of the year was approaching.

CHEAP OXYGEN FOR METALLURGICAL PURPOSES.

At a meeting held at the Chemists' Club, New York, January 17, at which Dr. Frederick G. Cottrell, Chief Metallurgist of the Bureau of Mines, Department of the Interior, was presented with the Perkin medal for distinguished service in chemical research, Dr. Cottrell, in accepting the honor, outlined certain investigations now being undertaken by the Metallurgical Division of the bureau, which, if successful, will result in a real revolution in the fundamental industries of the country.

Dr. Cottrell, in telling the chemists of this important work, said in part:

"When, at the suggestion of Sir William Ramsay, the British Admiralty first studied the possible use of helium for balloon purposes, they felt that the expense of production would be prohibitive. First, on account of the great scarcity of the element and the very great dilution in which it was found in the atmosphere (1 vol. in 250,000) and in other gases; and, second, because of the expense of the processes of separation then known to the Admiralty.

"When this information came to the U. S. Bureau of Mines it was remembered that some of the natural gases of Kansas has been found by Dr. H. P. Cady, of the University of Kansas to have over 1 per cent. of helium in them. The separation of helium from these gases could best be accomplished by the same general processes of liquefaction and distillation as are used to separate air into its nitrogen and oxygen for industrial purposes.

"It so happened that the Metallurgical Division of the Bureau of Mines had been making a study of these processes in the hopes of finding a way to sufficiently cheapen the production of oxygen from the air to allow its general use in metallurgical furnaces and other large scale chemical and industrial operations. If this were possible it would work a real revolution in these fundamental industries. Take, for instance, the smelting industry alone. We now concentrate everything that goes into the furnace (coke, ore, fluxes, etc.), except the oxygen of the air which we add with four times its volume of inert nitrogen and thus undo much of the effect of the concentration of the other cosntituents. If we could use pure oxygen, or more concentrated air, a great saving could be effected, and we could do in combustion furnaces much which is now only possible in the electric furnace.

"One of the processes which the Bureau had felt had much promise in this direction had not, up to this time, received an ylarge scale development, but now these facts were all called to the attention of our army and navy, who immediately jointly appropriated first $100,000 and afterwards further sums now aggregating over $1,000,000, for trying out the project not only along the line of the new process but also parallel therewith by the older and better known processes as well, and entrusted the general direction of this work to the Bureau of Mines.

"The plants on the older processes are already producing helium in large quantities and the one on the new and what it is hoped may prove several times more economic basis is just about to have its practical production test.

"If it fulfills anticipations, its significance is far wider than the production of helium, for it will open the possibility of oxygen in quantities at costs undreamed of by most chemists and metallurgists."

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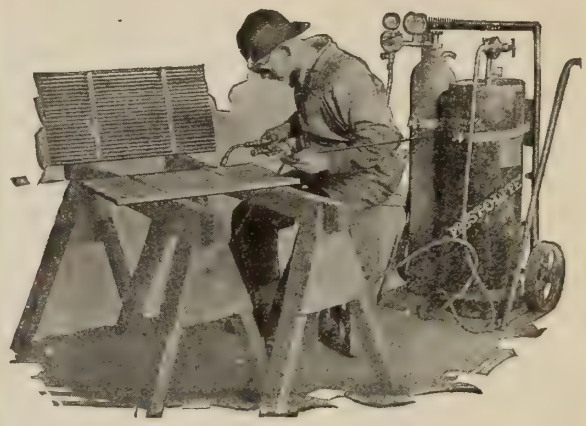

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MINING CONVENTION AT VANCOUVER.

On March 17, 18 and 19 there will be held in Vancouver the first International mining convention on the Pacific Coast so far as Canada is concerned. Some months ago it was considered by prominent mining men connected with the Chamber of Mines that the holding of a convention would give a filip to the industry in British Columbia, accordingly arrangements were made to bring it off in January last. Several causes led to the date being set back, but the above have now been definitely agreed upon, and the largest assemblage of mining experts on the North American continent will foregather in the city on Burrard Inlet.

The object of the convention is to give the citizens of British Columbia who attend, and those resident outside the province, an idea of the tremendous mineral resources of British Columbia and in that way to advance the interests of the mining industry in British Columbia as far as it is possible to do so. Those who are interested financially and otherwise in mining are of the opinion that there is a bright future ahead and that the coming convention will be the means of making the wealth of British Columbia better known to the world. In order to impress on visitors the splendid resources of British Columbia in minerals, a great collection of ores will be shown, and the mechanical se tion will not be the least interesting part of the di play.

The treatment of ores in the various stages will be d monstrated from the moment they leave the workin until they appear as the well known metals, such silver, gold and iron, and special attention is to be gi en to this department by a committee. No effort wi be spared to make this a fine exhibition. In then selves, these exhibits will be a splendid object lesson the manner in which ores are treated.

It is proposed to invite prominent engineers an geologists from all over Canada and the United State Already, invitations have been issued and a general a ceptance is anticipated. Men who are identified wit the largest mining corporations have already commence to make inquiries regarding the convention. It is e pected that the attendance will be of a thoroughly r presentative character.

The programme will include addresses by the distri mining engineers as well as by at least six prominer mine operators. A trip to a large mining centre being arranged. The details of this programme wi be given in a few days. Meanwhile, everything poin to the convention being an unqualified success.

FINANC DEPARTMENT

DOMINION INCOME WAR TAX ACT

TO WHOM APPLICABLE.

Every person who in 1918 resided or ordinarily resided in Canada or was employed in Canada or carried on business in Canada including corporations and joint stock companies

WHO SHOULD FILE RETURNS.

1 Every unmarried person or widow or widower, without dependent children under twenty-one years of age, who during calendar year 1918 received or earned $1,000 or more.

2 All other individuals who during calendar year 1918 received or earned $2,000 or more.

3 Every corporation and joint stock company whose profits exceeded $3,000, during the fiscal year ended in 1918.

FORMS TO BE FILLED IN AND FILED.

FORM T1. By individuals, other than farmers and ranchers
FORM T1A. By farmers and ranchers
FORM T2. By corporations and joint stock companies.
FORM T3. By trustees, executors, administrators of estates and assignees.
FORM T4. By employers to make return of the names of all directors, officials, agents or other employees to whom was paid $1,000 or more in salaries, bonuses, commission or other remuneration during the calendar year 1918
FORM T5. By corporations, joint stock companies, associations and syndicates to make return of all dividends and bonuses paid to shareholders and members during 1918.
Individuals comprising partnerships must file returns in their individual capacity.

GENERAL INFORMATION.

All returns must be filed IN DUPLICATE.

Forms may be obtained from the Inspectors and Assistant Inspectors of Taxation and from the Postmasters at all leading centres.

Returns should be filed immediately

Postage must be prepaid on letters and other documents forwarded by mail to Inspectors of Taxation.

Address of Inspector of Taxation for this District

MONTREAL DISTRICT.

Inspector of Taxation,
Post Office Bldg., MONTREAL, P.Q.

:-: EDITORIAL :-:

NOVA SCOTIA'S SUBMARINE COAL MINING PROBLEM.

A question of considerable interest, both from an engineering and a legal viewpoint has arisen in relation to the undersea extension of the Sydney (Cape Breton) coalfield. The system under which, during many years past, the undersea coal areas have been leased for operation and the mining of the coal contained therein, has permitted the "blanketing" of the leases of one lessee by those of another lessee, and a situation has now developed which calls for some remedial and corrective action by the Province, which is the lessor of the coal areas. The speech from the Throne at the opening of the local Legislature recently forecasted the intention of the local Government to enact legislation designed to correct the existing condition and "to protect local industries."

In this connection, the following remarks by Mr. F. W. Gray, which formed part of a review of coal-mining affairs in Nova Scotia during 1918 contributed to the "Halifax Chronicle" may be of interest to readers of the Journal:

The recommendation of the Fuel Controller that the Nova Scotia Steel & Coal Company should be allowed to mine certain areas leased by the Dominion Coal Company from the Province which abut upon the present workings of the Princess and Florence Collieries in such a manner as to prevent the seaward extension of these collieries, has brought prominently to public attention another deterrent factor in the future of the coal industry not hitherto disclosed.

It is not proposed here to enter into the merits of the controversy, which would be an invidious and delicate task, nor to deal with the causes that have created the present tangle of the submarine coal areas, because they have operated over a hundred years of the past, and as they form part of the history of the growth of responsible government in Nova Scotia, they bristle with controversial possibilities.

Be that as it may, the lease plan of the Cape Breton submarine coal areas as it exists today shows a checker board of conflicting and interfering leases that absolutely inhibit the extraction of the submarine coal by the methods which would commend themselves to a mining engineer interested in the best; the most complete and the most economical extraction of the submarine coalfield.

If some mischievous imp, some Teuton brownie from the Ehzgebirge, had set to work to "queer" the future of the submarine coalfield, it could not have been more thoroughly accomplished than is actually the case.

The lease lines that crisscross the submarine coalfield violate every physical and geological consideration, and this is what might be expected, because they were not designed to conform to natural limitations, but were arbitrarily drawn to further disconnected and often conflicting private and corporate interests during many generations. The last and the least consideration that has governed the framing of the inextricable maze of submarine leases has been the preservation of the coalfield for economical and lasting operation.

One can only say of the lease plan that, like Topsy, "it growed." No person living is to blame for the tangle, but the remedy is within the power of those who administer the coal areas as stewards for the people of Nova Scotia.

It is not realised that the Cape Breton submarine coalfield is a unique deposit of coal. Its exact extent is unknown, but we know enough of its probable extent to state confidently that it can provide millions of tons of coal per year for hundreds of years to come if—and here is the rub—if it is conceived as one vast mining operation, as a field in which one false or unwise operation may depreciate the value of the whole, and even impair its accessibility.

In a Memoir on "The Coalfields of Eastern Canada" written for the Federal Department of Mines three years ago, the writer in summarising the mining laws of the Province in relation to the unworked submarine coalfield, hinted at the state of affairs which has now been revealed by the Fuel Controller by remarking that it was the obvious duty of the present generation:

> "so to prosecute the work of extraction as not to imperil the accessibility of the remaining submarine coal."

This is precisely what the present arrangement of the submarine leases will not permit of being done, and if the future mining operations under the sea essay the thankless task of adherence to existing lease lines, it will result in imperilling the greatest single asset of this Province.

The extraction of the submarine coal under the most natural conditions is equivalent to their extraction under the least costly conditions.

This means everything to the Province as landlord of the leased areas.

In discussing the limitations to working the submarine coalfield, in the Memoir just referred to, the writer ventured to predict that the cost of mining would be the first limiting factor to make itself felt. If this is the case, it is extremely desirable that no artificially difficult conditions of extraction should be unnecessarily imposed on mining coal from submarine territory, because this will cause the limit of profitable mining to be reached sooner than would otherwise be the case, and the Province will the earlier lose its revenues and all the other advantages that accompany the production of coal.

If it had been possible that the leasing submarine areas could have been governed by previous experience in their operation, it would have been realised that a submarine coal area is not comparable to a land area, because a land area can be reached by shaft or slope from the surface at any point, but access to submarine areas is limited to certain parts of the shore, and it would have been seen that no submarine leases should have been granted, unless their accessibility was secured by the terms of the lease itself. Of course, hindsight is distinctly better than foresight.

The conflicting interests of the coal operators—or rather their supposedly conflicting interests—have hith-

erto prevented them from making an unprejudiced survey of the future of the submarine coal areas. It has not been realized that submarine coal extraction in this Province is as yet only an economic experiment, and the success of that experiment is not any too clearly demonstrated.

In view of the gloomy outlook for the coal industry in Nova Scotia, it would be well if it might be seen that a persistence in the present unscientific and mutually destructive policy with regard to submarine coal areas may involve in general disaster all concerned, operators, miners and the country generally. The industry is admittedly going to have sufficiently hard work to keep its head above water without the addition of unnecessary duplication of expenditure and effort, and without the totally unnecessary addition to the cost of extraction which adherence to existing lease lines will inevitably cause.

The truth is that the whole submarine coal question is due for review.

A plan should be made of the whole coalfield from Cape Dauphin to Mira Bay showing the existing submarine workings, the course of the land and submarine outcrops, the course and nature so far as known of the parallel folds and faults that traverse the coal field. Due consideration should be given to the facts disclosed by soundings at sea, the nature of the sea-bottom, the depth of superincumbent strata, the spacing of the coal seams, and the probable extent of the submarine coalfield.

This plan should be viewed as a whole by competent mining engineers, who should disabuse their minds of any questions concerning lease lines, and it should be conceived as one operation, from the viewpoint of the owners of the coal, not the viewpoint of the leaseholders.

The conservation of the submarine coal, its protection from inundation, creep, incompetent mining, and the preservation of its accessibility over the maximum period of operation, should be the guiding ideas; and, if this were done, it is certain that a radical re-arrangement of the submarine leases would result that would benefit everybody concerned, even those competing coal operators who do not today apprehend the true significance of the signs of the decadence of the local coal industry, and the necessity for compromise and reasonableness unless all alike are to be involved in a common future disaster.

THE DOLLY VARDEN RAILROAD.

An investigation is in progress before a special committee of the Legislature of British Columbia of vital importance to the mining industry of the Alice Arm Section of the province, which is believed to be one of the richest mineral bearing areas of the north-west coast of America.

The trouble is over an eighteen mile narrow guage railroad which was constructed from the coast into the mountains for a distance of eighteen miles, its purpose being to provide transportation facilities for the Dolly Varden mine and for other promising properties along its route. The road is almost complete. When within a very short distance of its goal work ceased. The Taylor Engineering Company, the contractors, were short of funds. Workmen found themselves laid off without pay and without notice. Since then a mining district which was being rapidly developed, and the promise of which became brighter as time went on, has lacked most of the signs of industry. The workmen are waiting for their wages and mine operators and prospectors are waiting for the tangle to be straightened out.

Since what has been detailed occurred, various things have happened. The property of the Dolly Varden Mining Company, which includes the road, has been sold to the Temiskaming Mining Company of Toronto, the consideration being $700,000. Mr. A. J. T. Taylor, president of the now defunct Taylor Engineering Company, has applied to the Legislature of British Columbia asking that the Dolly Varden Mining Company, former owners of the property, be compelled to meet what he claims to be its liability to the constructors of the road. He has given testimony that the work was started on a ten per cent plus basis on a written estimate that the road would cost not more than $175,000 and a "gentleman's agreement" with Mr. J. D. Hubbard, president of the Dolly Varden company, that he would see that any cost above that amount would be met. The enterprise, however, cost considerable more than the mentioned figure, apparently, as Mr. Taylor's claim is for $467,000 although he states that he offered to reduce this to $375,000 if the company would pay it from the $700,000 received, or to be received, by virture of the sale of the property. His petition to the Legislature is that a renewal of the charter, under which the railroad is being built, be refused, thus preventing the finishing of the several hundred yards of steel yet to be laid, pending the satisfaction of his demands. The Dolly Varden Company takes the position that the petitioner should share with them in the general loss, it being their assertion that the sale, at the price given, has meant a loss to them.

In support of Mr. Taylor's position interesting evidence has been given by Mr. J. S. Connell, C.E., who was the engineer in charge of construction. The original estimate of $175,000, he said, was for a rough road which would follow the centre of a pack trail in order to enable thirty tons of concentrates to be brought to tidewater daily. No surveys were made, as the Mining Company wanted speedy action. After work was commenced, unexpected difficulties were encountered. The road in some places had to be cut out of solid rock on the walls of gorges and canyons so precipitous that the men were lowered down with ropes to start a foothold. After the road had been partly made, Mr. Connell said, the cost had been greatly increased because it had to be cut out two feet wider and the curves made to conform to the requirements of the expected buyer, the Granby Consolidated Mining & Smelting Company, which proposed to take out 400 tons of ore daily. It may be said incidentally that the statement has been made in the course of the inquiry that the Granby Company actually made an offer of $850,000 for the property, which was declined owing to objection being taken to the terms of the proposed agreement.

It is likely that the Committee of the House having the investigation in hand will be in a position in the course of a few days to submit a recommendation to the Legislative Assembly. Pending this and some disposal of the petition by the members of the house, the railroad is tied up and mining operations in the district at a standstill.

An amendment to the Mineral Survey and Development Act of British Columbia, giving the resident mining engineers of the Province power to enter into mines and plants in connection therewith for inspection purposes, has passed the Provincial Legislature and will become law on receiving the assent of the Lieut.-Governor.

The Wealth of the Hinterland of Ontario

By J. A. McRAE.

Scanning the hills of the North who can estimate their potential riches? To those not familiar with the North we would say: Vision these hills, ridge upon ridge, row upon row and almost endless, stretching hundreds and even thousands of miles through the wild. During the past few years a world of men made purblind in the mad rush of war and war industries, have been passing along the main highway —have passed our very threshold, and have failed to see. They have seemed to overlook the fact that in a brief span of the opening years of this twentieth century, the precious metal mines alone have yielded nearly one-quarter of a billion dollars. Perhaps they also fail to realize that in a lesser space of time it will yield as many more. Other veins, moss-covered, or perhaps exposed to the sun, await discovery. Other mines, possibly, the richest of them all, are to be developed.

In recent times the old-time prospector has been considered a back number who has largely outlived his usefulness, and considered out of place among modern surroundings. Now, however, his importance is becoming better realized than ever before. Modern mining machinery and modern ore treatment methods are resulting in intensive mining, which shortens the lives of the mines. As a consequence, far sighted men are pointing toward the urgent need for a greater amount of prospecting and the opening of new producing properties.

There is only one way in which mineral deposits are to be found, and that is to search for them. This, clearly, is the logical task of the prospector and he should be encouraged to put forth his best efforts in the exploration for additional mining fields, and in being adequately rewarded for his discoveries. The Ontario Bureau of Mines is paying particular attention to the prospector. Anything that will tend to promote greater activity among the prospectors, and anything that will prove beneficial to them finds ready recognition. His burdens are still heavy, but in order to keep the wildcatters and claim blanketers from getting too strong a foothold in the mineralized area, these burdens cannot be removed. Therefore, in a sense, these very burdens afford protection to the legitimate prospector. Despite burdens, the genuine prospector has refused and still refuses to be downed. He continues to trudge over the hills in search of hidden millions which he invariably feels certain he will ultimately find. And in many instances his most resplendent dreams come true. He it is who discovered all the mines that are now making the shareholders of the mining companies rich and which gives labor to a veritable army of men. To him the world is indebted for the discovery of its most profitable mining areas. He is entitled to liberal legislative recognition; and, as producing mines grow fewer, while the metal demands grows larger, he is, at last, coming into his own. The Mining laws of Ontario have been designed to encourage him.

Favored with thousands of square miles of undeveloped mineral lands where the geological conditions point toward the likelihood of numerous great precious metal mining camps; favored with unlimited water, which from babbling brook to broad rivers afford arteries along which the seeker of mines may roam with ease and when finally harnessed would generate abundant power to drive industrial wheels; favored with timber lands, unlimited as far as the use of the pioneer is concerned, and under Great Britain's flag of freedom where laws are made for those who try; favored with the protection of an Anglo-Saxon race, this country, this Northern Ontario on the fringe of which we live, offers to mining men the world's greatest promise.

The North values highly its man of creative genius — that is to say, its optimists. Had it not been for such men there would perhaps have been no Cobalt, no Porcupine, no Kirkland Lake, and no Boston Creek. The prospector is an optimist. It should also be pointed out that there is another optimist — the man with money and with sufficient courage to apply it efficiently in the development of promising mining areas.

A few years ago the great majority of people frowned upon the narrow veins of Cobalt. In the early days the surface discoveries of Porcupine, looked dubious, and were often referred to pessimistically. At first the veins of Kirkland Lake appeared narrow and inconsistent. In a word, in each case, the opinion of many people was one of grave uncertainty. Yet, in each case the optimists came to the rescue, and, with courage commensurate to their optimism, applied their finances lavishly but efficiently and made the north country the great mining centre that it is to-day. To these men of creative genius the Dominion of Canada owes a debt of gratitude, and to them Northern Ontario owes its present great prosperity. It was they who laid the foundation for the rapid progress now taking place.

Therefore, when some day historians will write the closing lines of the mining era of Northern Ontario, let them not forget the part played by the prospector and those who have backed his efforts with their finances.

In Temiskaming less than twenty years ago the moon rose and set, and old Sol spent his sunny smile on a land bedecked with stalwart pines that moaned with the fragrant breezes and where murmuring brooks rippled their way like silver threads through valleys clothed in forest shadow. On every hand was the verdant sweep of unbroken timberlands, the hunting ground of Indians. Little did they think that beneath the ground—perhaps beneath their vedy camp-fires — lay the world's richest deposits of silver or veins of virgin gold.

The fabulously rich deposits of silver at Cobalt, for more than a century lay in the very shadow of old Fort Temiskamingue. Throughout the days and the nights, the months and the years, no sentinel kept vigil over this vast storehouse of precious metal. Nature itself flung its camouflage of moss over the weathered and jagged outcrops. The question is often heard: 'will history repeat'? From farther north comes the answer, emphatic, and in the affirmative.

Less than 100 miles north of Cobalt, where less than ten years ago was naught else known to man but unbroken wilderness, now lies the world's greatest gold

mine. Round about it are being developed other gold mines of greater proportions. Up until ten years ago an Indian trail wound its way over "Hollinger Hill" from which in the past few years has been mined some $26,000,000 in gold with at least $41,000,000 more blocked out and ready to mine. It is perhaps a revelation to many to learn that within the memory of the youngest of full grown Indians whose haunts were the Porcupine regions, is the picture of Indian tee-pees sitting squat and picturesque on the very brow of that now famous hill. Down over that old trail the Redskins have trekked to and fro, fleet of foot, down through the centuries. Over its winding way had tripped smiling Indian maidens at the heels of their braves. And all the while on either side lay great quartz veins containing scores of millions in gold. Readers may say: Yes, but all this is past! To what avail is this fact in history! How are we to win a share? Are we not too late?

Round about is spread a land pregnant with the answer. At the discovered mines the great whistles that call to toil a veritable army of men, send out their echoes and re-echoes through the valleys and the hills. Farther away comes the faint ring of the prospector's pick on the hillsides as though whispering back an answer from the mines that may yet be born.

Will history again repeat? The probabilities appear to be that it will, not only once, but time and time again—so vast is the precious metal bearing zone as yet practically unexplored.

JUALIN ALASKA MINES.

Work will be resumed at once on the property of the Jualin Alaska Mines Co., at Jualin, Alaska. This property was taken over in 1912 by The Algunican Development Co., a Belgian-French company, with head office at 16 Rue de Turin, Brussels, Belgium. At that time a 7,800 foot tunnel was started, intended to crosscut the vein system at a lower depth and also to drain the mine water. This tunnel, which had advanced 2,000 feet, was discontinued when war broke out and attention confined to the actual production of the mine. All work was suspended in November, 1917, owing to the labor shortage and extreme operating conditions. During the last operating year this mine produced nearly $200,000 in gold from a ten stamp mill.

It is now proposed to complete the tunnel and at the same time carry out an active programme of development from the present workings. Until the completion of the tunnel no ore will be milled except that obtained from developing headings.

Jean Vanophem, Brussels, Belgium, is president. Chas. G. Titus, Juneau, Alaska, is general manager.

Ore receipts at Trail in gross tons for the week from 1st February to the 7th of the same month totalled 8,402, which makes an aggregate for the year of 43,685 tons. Of the latter total the Boundary District contributed 3,321 tons; East Kootenay, 22,704; Nelson and Salmo, 353; Rossland, 14,275; and Slocan and Ainsworth, 1,761 tons.

Slocan, B.C.—The Noble Five and the Ivanhoe Mines of the Slocan District, which were practically closed down during the influenza epidemic, have resumed operations with full crews.

WAGES, HOURS AND UNION CONDITIONS AT THE NOVA SCOTIA COLLIERIES.

In October 1918 the Amalgamated Mine Workers of Nova Scotia met in convention in Sydney and formulated a schedule of wage rates and working conditions constituting the proposed basis of a new arrangement with the coal operators at those collieries where the workmen were represented by the A. M. W. of N. S. to follow the expiry of the wage agreement which terminated at the end of 1918. The demands contained in the schedule were very large, and involved some radical innovations in working conditions, such for example as an eight hours day, and the substitution of the short ton as the basis of payment for the long ton with the retention of former or increased tonnage rates. The increases contemplated by the schedule, if applied, would have meant an addition of three dollars per ton to the cost of mining coal.

At the call of the Minister of Labour the union representatives were asked to meet the coal operators in Montreal, and a meeting of a preliminary character was held there in January, which was adjourned after arranging for a further meeting in Sydney to be held in February. At the meeting in Montreal the workmen of the Pictou and Inverness Fields were not represented, these districts being organized under the American Federation of Labour, but invitations were issued asking that these districts should be represented at the meeting in Sydney.

On the 19th February, delegates from all the collieries of the Province assembled in Sydney and met in joint conference representatives of practically all the coal companies in Nova Scotia. The joint conference brought together a very large gathering, there being almost two hundred union delegates present and about twenty representatives of the operators. From the main conference a sub-Committee was appointed to examine and report in detail on the matters in question which were chiefly three, namely, the request of the workmen for an increase in wages and the formulation of a new wage agreement, the granting of an eight hour day, bank to bank; and the assent of the operators to the intention of the Amalgamated Mine Workers to join the United Mine Workers of America.

The sub-Committee continued in session throughout the remaining portion of the week, and made recommendations, which were afterwards accepted by the workmen, of a most important and far-reaching character.

On the matter of wages the operators stated from the outset that the condition of the coal trade, the already greatly increased and unprecedented cost of mining, the reduction in production and the competition from outside fields, would not permit of the granting of any increase in wages. It was pointed out, and was of course well known to the delegates present, that many of the mines in the Province were either entirely idle or were working intermittently because of the slackening of demand for coal in the Province and the temporary inaccessibility of the Montreal market of Nova Scotian coal, so long as the shipping shortage continued and high freighting rates prevailed. An increase in wages could only result in a greater amount of idleness, and as there was a disposition on the part of the operators to consider some modification of the working hours — which in itself is equivalent to a large increase in wages — the sub-Committee reported in favour of allowing the matter of wages

stand untouched, subject to notice of adjustment by either of the parties upon thirty days notice. Provision was made for adjustment of local conditions which might arise.

On the matter of the Eight Hour Day, the sub-Committee reported as follows:

"The operators have carefully considered the proposal of their employees for an eight hour day, and being most desirous as far as possible to meet their wishes, would submit the following offer:

1. The collieries will commence to hoist coal at 7 a.m., at which time all the men must be in the mine.
2. The day's work will cease at three o'clock, when all arrangements will be available for conveying the men to the surface.
3. The surface men around the bankhead and screens associated with the handling of coal are to be on duty betwen the hours of 7 a.m. and 3 p.m., and for a short time after if necessary for the purpose of attending to such duties as will facilitate their own work, such time not to exceed half an hour.
4. The standards of other surface labor around the collieries to be from 7 a.m. to 4 p.m. with half an hour for dinner.
5. Where continuous attendance is required, the shifts will be eight hours instead of twelve, both surface and underground, at the same pay.
6. The conditions peculiar to certain localities will be adjusted locally.
7. To become effective March 15th, 16th or 17th, according to the date of making up the payrolls.

NOTE.—Explanation of Clause One means that the mine will run continuously between the hours named without any stop whatever.

The management of the Dominion Coal Company promise to meet the Executive at an early date, in connection with other departments such as the machine shop and section men, and it is expected that other companies with similar work will do likewise."

In regard to the announced intention of the A. M. W. of N. S. to join the United Mine Workers of America, the sub-Committee reported as under:

"After having had the assurance of the Executive of the Amalgamated Mine Workers of Nova Scotia and the representatives of the Federation of Labour, confirming the statements made in Montreal by Mr. Harlin of the United Mine Workers of America, that the desire of the A. M. W. of N. S. to have the U. M. W. of America extend its jurisdiction to Nova Scotia does not arise from any intention to make the wage rates and working conditions of Nova Scotia conform to those obtaining in other districts of the U. M. W. of America, and that local districts will receive complete autonomy, and also that the limitations of Nova Scotia in regard to outside competition in the sale of coal and recognized by the incoming U. M. W. of America, and will always be borne in mind in the future, the operators agree to the extension of the U. M. W. of America into Nova Scotia, if that should be the desire of the majority of the mine-workers."

The net result of the Convention therefore was an agreement to leave the matter of wages and a new working agreement in abeyance until the changing conditions of the coal trade permit of accurate views as to the future of trade conditions; the granting of a modified eight hour day, and the extension of the jurisdiction of the United Mine Workers of America over the whole of the collieries in Nova Scotia.

The holding of the Convention and its outcome, is one of the signs of the times, and your correspondent is reluctant to add words of comment at a time when the world generally is tired of opinions and theories, and when events are taking place quicker than the average scribe can describe them.

One might comment however that the agreement upon an eight hour day contains the germ of much that is yet to occur in connection with the coal trade of Nova Scotia and its future progress. It is not conceivable that it will long be regarded as good business to have the entire development of a large colliery and its costly equipment producing coal only eight hours out of every twenty-four, and possibly working only five days per week. If business acumen should allow this, or the attitude of the workmen should attempt to compel a retention of the single shift system, the competition of outside sources operating under conditions of more complete and continuous utilisation of the mine equipment, will compell Nova Scotia to conform to more modern methods of concentrating the working forces, or go out of business as a coal-producing province. In other words the necessary accompaniment of an eight hour day is the double or triple-shift system.

The compelling factor in Nova Scotia is the large percentage of the untouched coal reserves of the Province which lie under the sea. These deposits are large, but the points where access can be obtained are few and the outlet, or the "bottle-neck" is limited. Practically continuous hoisting up large shafts is the only way in which large bodies of workmen can be employed in mining coal from under the sea, and it can easily be seen that the adoption of an eight hour day, which if rigidly enforced would limit the hours of hoisting within a small and rigid compass, will take a great deal of working out unless the production of the collieries working under the sea is to be distinctly limited and shortened from now onwards. Other results which must follow are more intensive production during the prescribed hours of labor, the tremendously increased utilisation of mechanical devices, and arrangements for production on a large scale. This in turn will involve capital expenditures beyond the capacity of the existing coal companies, and above all, the future of the industry will be conditioned to the fact that coal-mining in Nova Scotia must always cost relatively more than in the United States and in other coalfields that do not come so directly into competition with the product of Nova Scotia.

The further working out of the hours problem at the collieries in Nova Scotia will be interesting to follow, but a casual consideration of the problems involved will indicate that while it is one thing to agree to a principle it is quite another matter to work it out in practice.

One very pleasing feature of the Convention was the consistently high level of the discussion, and the fair open and considerate manner in which both sides thrashed out their difficulties and endeavoured to merge their differing viewpoints. The whole Convention was significant, in view of much that has passed, and much that is still to take place, but from this point of view, distinctly hopeful and of good augury for the future.

New Legislation Affecting Coal Mines of British Columbia

Regulations of first importance to the coal mining industry of the Province have been laid before the British Columbia Legislature by Hon. Wm. Sloan, Minister of Mines, in a Bill entitled "An Act to Amend the 'Coal Mines Regulation Act'". They will radically change for the better the present system of conducting examinations for 1st, 2nd, and 3rd class coal mining certificates, removing much of the present superfluous administrative machinery by placing the now widely distributed authority in the hands of one competent and responsible board of examiners. The same applied to the existing methods of examining and issuing certificates of competency to coal miners, and it is being proposed that one travelling board of examiners shall have charge of this important work, the duties of which shall be to go from colliery to colliery throughout the province for the purpose of passing upon the proficiency of coal miners applying for certificates. Various other changes are provided for, having in view making the mines safer and removing, as far as possible, the chief dangers with which the underground workers have to contend. In some of the latter legislation British Columbia is setting the pace for America, notably in respect of the proposal that all wire cables shall be given hot oil baths at regular intervals and that amendment which in its application, will practically eliminate all but safety lamps in underground coal workings.

Minimum Wage Board.

The initial provision of the Bill is under the sub-title, "Constitution of Coal-Miners' Minimum Wage Board." The text of this section is clear in itself. The said board is to consist of the chief inspector of mines as chairman and "two other members to be appointed by the minister, one of whom shall be appointed to represent the mine-owners and one to represent the coal-miners." The duties of this board shall be to "define and redefine any portion of the province as a minimum wage district for the purposes of this section; to improve conditions and exceptions to which the application of the minimum wage in any district shall be subject; and to regulate the time and manner of giving notice of the sittings of the board and the conduct of business thereat." Having fixed a district to which a minimum wage shall apply, its duty, naturally, shall be to decide what the minimum wage, within the bounds of the area, shall be, proper consideration being given to general conditions as may be shown by evidence or representations made by the parties affected. For the latter purpose a full opportunity is to be given for hearing at a public sitting of the board of all interested. Any order made shall come into effect on the minister's approval and its publication in the Provincial Gazette "at least thirty days before the day named for its coming into operation." If any coal-miner is paid less than the minimum wage to which he is entitled he may recover from his employer in civil action that which is justly due him. This will commend itself to all miners of British Columbia, and, in any event, it cannot but be considered as a step in the right direction, evidencing on the part of the government an active and direct interest in the question of the remuneration received by underground workers.

Board of Examiners.

The appointment of a board of examiners "to conduct the examination in any part of the province of applicants for certificates of competency," is another important innovation. At present this Board consists of three coal mine managers and three representatives of the men from different parts of the province, together with the chief inspector of mines. Its headquarters are in Nanaimo, B.C. Two of the men's representatives are of the Crowsnest Pass coal district, and in the past five years, on one occasion only has one of these representatives been able to attend a board meeting. While provision is made to pay the travelling expenses of those who have come from a distance this reimbursement by no means covered the loss of time which trips from various parts of the province to the coast entailed. The result has been that the board often found it difficult to obtain a quorum. Its duties, too, have been merely of a supervisory character in connection with examinations. It called a meeting, set a date for examinations, appointed outside parties to prepare examination papers forwarded these on their receipts, and passed upon by the appointed examiners forwarded the results to the Ministers of Mines. It is felt that much of this procedure is useless and besides has had the effect of leaving functions of vital importance in the hands of a few, it being impossible in many instances, as has been shown, for the men's representatives to be in attendance, at regularly called meetings. The proposal now is that the new board, shall be composed of three members only, one being the chief inspector of mines, as chairman, and two others to be appointed by the Minister, "one of whom shall be appointed as representing the coal owners and one as representing the coal miners." It will be the duty of this body, which will be small and by reason of that able to move easily from point to point if necessary, to conduct the examinations.

Conduct of Examinations.

The bill makes provision for another alteration in respect of the conduct of examinations of miners applying for certificates of competency. Under the Coal Mines Regulation Act as it stands most of the collieries have their own boards for this purpose, the membership of which consists of a secretary appointed by the Lieutenant-Governor-in-Council, a representative of the mine management and a representative of the men. This arrangement, it is pointed out, was satisfactory so long as there were only a few large operating mines in the province. Conditions, however, are changed. There are now a considerable number of small collieries, and, if each of these were given a board to which they are entitled under the Act, there might be almost as many members of examining boards as there are miners come up for examinations monthly. The situation at the moment is that there are small mines such as that at Telkwa, Northern British Columbia; Coalmont and Princeton in the Interior, and Granby and Nanoose on Vancouver Island which are without boards. Consequently miners applying for certificates to work in any of the latter mines must travel considerable distance, in many cases, to take their examinations. Telkwa miners, for instance, must come to Nanaimo; those of Coalmont to Merritt; and

those of Nanoose to Nanaimo. In other words, if the methods now in vogue were continued, it would be necessary to appoint at least five boards in addition to the nine now organized and some of these would have to be maintained in camps where the number of miners employed is exceedingly small. The board proposed to handle all examinations for miners' certificates of competency, will eliminate this cumbersome machinery. Its personnel will be fixed in the same way as that of the board of examiners for "managers of mines, overmen, shift bosses, shotlighters and mine surveyors, except that the inspector of mines, for the district in which the examination is held," will be the chairman instead of the chief inspector of mines. The other two will be named by the Minister of Mines, one as representing the operators and the other the men. The two latter will have jurisdiction throughout the province and will move from colliery to colliery at frequent intervals in order to facilitate the issuance of certificates to those who can show that they are properly qualified. This will have the effect of fixing a standard of knowledge for coal mines throughout British Columbia. It will obviate the present difficulty of too much board representation at one point and too little at another; and it will be an added convenience, both to the men and the management of collieries. Another improvement in this connection is that no man will be admitted to a mine to work as a coal miner for a temporary period, pending his examination, as is now allowed. If a man applied for work as a miner and an examination immediately is impracticable he must go before the inspector of mines of the district who, having satisfied himself of the man's qualification, will issue him a temporary certificate. In such cases, however, those affected must go before the regularly constituted board at the first opportunity. The position taken by Mr. Sloan here is that it is a manifest absurdity to allow an uncertificated man to assume the responsibilities of a miner for thirty days without his knowledge being tested, it being possible in that period for an incompetent person to endanger, not only his own life, but that of hundreds of others. ...

Besides such a system, it is considered, will facilitate the control of the practice, where it has been followed, of permitting aliens to work underground. This is a matter on which Mr. Sloan feels strongly and he is confident that, when it is necessary that every man going to work as a miner for any period, no matter how brief its duration, shall prove his qualifications the employment of this class will be effectively checked.

Duties of Fireboss.

A clear definition of the duties of a fireboss in a coal mine also is given by the amending measure, it being set out that "the district of a mine assigned to any fireman shall not be of such size as to prevent him from carrying out his inspection duties under this rule in a thorough manner." It has been a standing complaint on the part of men holding this position, and coal miners generally, that firebosses are handicapped in the faithful discharge of their responsible and important duties by being required, in addition, to attend to haulage, pumps, and various other matters with the result that often their duties at the working face have been neglected. It now is to be made law that this official shall "devote his whole time to his inspections duties," the exceptions being only "where the duties assigned to or undertaken by him in addition to his inspection duties are not such as prevent him carrying out his inspection duties in a thorough manner." It is laid down too that this "shall not prevent the fireman being employed in measuring the work done by persons in his district, or in firing shots in his district, nor shall this provision apply in respect of any mine in which the total number of persons employed underground at one time does not exceed thirty." It further is provided that "where any question arises as to whether any additional duties are such as to prevent a fireman carrying out his inspection duties in a thorough manner, the inspector of the district shall decide the question, and his decision shall be final."

Dangerous Gas.

One of the most vital of the amendments from the viewpoint of the mines and of the miners is that which states that, where the mine air in any working placing is found to contain from 2½ per cent. and upwards of inflammable gas it shall be deemed dangerous and the men forthwith withdrawn. The Coal Mines Regulation Act now reads that at any time that the air is found by the person for the time being in charge to be dangerous the miners shall be withdrawn. Thus, it is left to the individual judgment of one person to decide what is, or what is not the danger point. That is considered to be too indefinite and to leave too great responsibility on the shoulders of an official. Therefore, it is proposed, as has been done in Great Britain, to fix a definite withdrawal point. It may be said, incidentally, that the percentage named as that at which danger commences has been applied by the Department of mines, under agreement with the Crowsnest Pass Collieries, to the latter coal field for some time.

Safety Lamps.

Then comes the amendment which, it is thought, will mean the introduction of safety lamps in practically all the coal mines of the province. Such lamps, it is stated, shall be used, and none other, "in any mine where the air current in the return airway from any ventilating district in the mine is found normally to contain more than one-half of one per cent of inflammable gas." The wording then goes on to take in that of the Coal Mines Regulation Act as it now reads to the effect that such lamps must be used in every approach to any places where there is likely to be an accumulation of gas. The method to be adopted in fixing the percentage of inflammable gas in this case is the same as that already detailed.

In addition to this provision is made against any possibility of argument or misunderstanding as to how the percentage of gas in mine air is to be arrived at by the following sub-section: "The average percentage of inflammable gas found in six samples of air taken in the air-current in the return airway from the ventilating district at intervals of not less than two weeks shall, for the purpose of this section, be deemed to be the percentage of inflammable gas normally contained in the air current."

Care of Winding Ropes.

The provision that "every winding-rope shall be given a bath in hot oil before being installed; that every winding-rope shall be re-capped at intervals of not more than six months, and that no winding-rope which has been in use for more than two years or which has been spliced shall be used for raising or lowering persons" no doubt is the direct result of the lamentable accident of last September at Protection shaft, Western Fuel Company, Nanaimo, when a number of miners lost their lives through the breaking of a cable. The verdict of the Coroner's jury, it will be recalled, was that

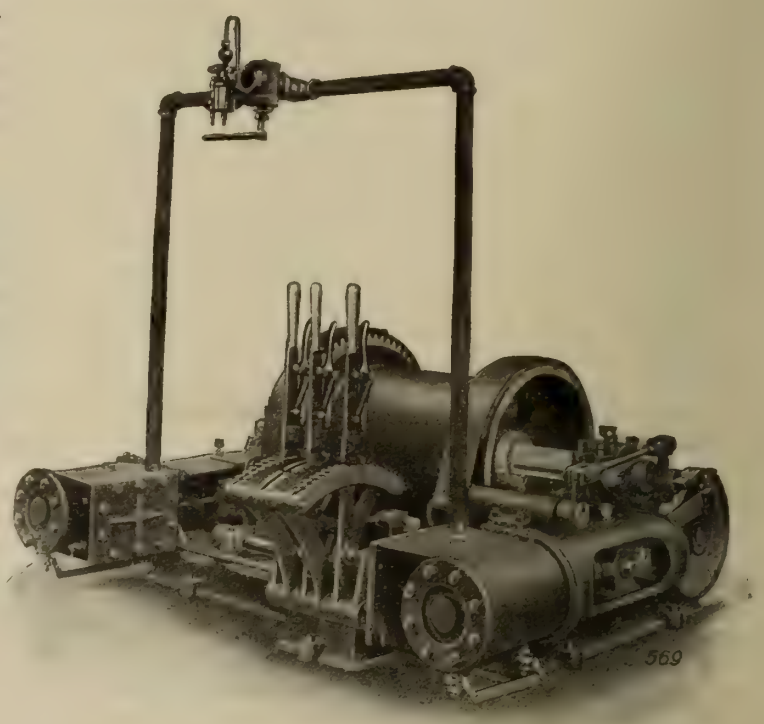
the evidence indicated that the cause of this break was internal corrosion, the primary cause of which was lack of lubrication. It is proposed, therefore, that no cable shall be without proper attention in this respect hereafter. Not only is this safeguard to be provided, but no cable is to be used for more than two years for raising or lowering persons. The question of the life of a steel cable is a matter which has been under discussion with no result for many years. Men of the highest technical qualifications have made investigation, but there is no fixed standard as to the life of such cables yet arrived at. In Great Britain they may be used for three years and six months, so that British Columbia is increasing what is considered an adequate margin of safety there by one and one-half years.

To try and prevent crystalization of chains it also is provided that "all cage-chains in general use shall be annealed once at least in every six months, and detaching hooks shall be cleansed and refitted once in every three months."

THE CIRCO HOISTING ENGINE.

The Canadian Ingersoll-Rand Company has recently re-designed its line of hoisting engines, taking advantage of its winch engine experience to incorporate in hoisting engine some of the features found to be of advantage in winch engine design.

One of the principal features borrowed from winch engine practice, and applied to the hoisting engine is the frame, having cylinders cast separately. With this construction, cylinders are now made interchangeable right and left, and one spare only need be carried for either side. The frame has been strengthened, and is neater and more compact than the older designs. Cylinders are provided with top and bottom exhaust; for steam drive either top or bottom is used as may be more convenient. Each cylinder is provided as usual with two drain valves; a little convenience that will be appreciated being a centrally located quadrant lever operating the four drain valves together.



As will be seen from the illustration the hoisting engine has bored guides; the advantages of this construction are numerous — crosshead guides are bored and end of frame faced at the same time, giving accurate alignment, stress is more evenly distributed, lubrication is easier, etc. Crossheads have adjustable shoes, piston rods are screwed into crossheads and secured by heavy check nuts. Conecting rods are of forged steel of the solid end type, eccentrics and eccentric rods of locomotive type, gear and pinion of semi-steel. The drum-shaft bearing and pillow-block are cast separately from the frame, the advantages of this type of construction being more accurate alignment and greater ease in lifting out the drum when necessary. The cranks are of the counterbalanced disc type, pressed on the shaft, discs being finished and pin holes bored after the discs are pressed on.

SAINT LOUIS FUR EXCHANGE BUYS DIRECT FROM TRAPPER.

Due to certain complaints being brought to the notice of the St. Louis Fur Exchange, 7th and Chestnut Streets, St. Louis, Missouri, U.S.A., of unsatisfactory grading of furs as made by some of the advertising fur houses of that market, where in January over ten million dollars worth of furs were sold, they are now also receiving shipments of furs from the trapper direct, and are recognized and registered under license P.B.F. 30 with the U. S. War Trade Board and all of the Collectors of Customs, thus insuring free passage of furs when addressed to them with the words, "Raw furs of Canadian Origin" on the package or shipping tag. Their advertisement appears on page 17.

TO ASK DOMINION GOVERNMENT.

At a meeting of Associated Boards of Trade of Eastern British Columbia, held at Revelstoke, B.C., the Nelson Board of Trade introduced the following resolution, which was endorsed by the Convention:

"That the Dominion Government be requested to erect and operate plants for testing and concentrating mineral ores."

This is a good movement to get behind and push.—F. E. Payson.

Trail, B.C.—New shippers this year to the Trail Smeltery are the B.C. Mine, of Eholt, with 60 tons and the Silver Standard of New Hazelton, with 80 tons.

Convention Exhibition

As will be seen from the following the public will have a chance to see some exhibits in connection with the Mining industry which have never been placed on exhibition in Vancouver before:

Apart from mining operators and those who are otherwise identified with mining, few persons have ever seen a flotation plant or a concentrator in actual operation. These two pieces of machinery will be on exhibition at the display of ores and other things in connection with the International Mining convention which will be held in Vancouver on March 17, 18 and 19 next. The exhibition, as has already been stated, will be in the basement of the Vancouver building which will be brilliantly illuminated and in which there are over 5,000 square feet of floor space.

Arrangements have been completed for the installation of these machines and delegates to the convention will be given the unique opportunity of seeing them at work on the three days that convention is sitting. Considerable expense is being incurred by the Chamber to make this display the most comprehensive and up-to-date that it is possible to do. Applications for the display of exhibits must be made to Mr. S. J. Crocker of the B. C. Equipment Company, Vancouver or to the Secretary of the Chamber of Mines.

While the list of exhibits is not ready yet, it can be said that everything essential to the mining industry will be on view. This will include specimens of ore from gold to iron, bars of pig-iron, samples of galens and every ore indigenous to British Columbia. In addition to the ores and machinery there will be a large display of trucks suitable for mining purposes. Inquiries that have been received would indicate that the exhibits will not be confined to B. C. though preference will be given to the local articles.

The chairman of the exhibition committee hopes to be in a position to give a complete list of the exhibits within a week or ten days, so that delegates coming from a distance will have an opportunity of becoming acquainted in a measure with what they are going to see when they arrive in Vancouver. It is sufficient to make this exhibition the success it is certain to be, and that nothing will be missing that will tend to place it in the front ranks of exhibitions, if not the premier position of similar displays in British Columbia or Canada for that matter.

We Are After Them. — They Are Coming.

The reports that are being received from the members of the committee who have undertaken extensive itineraries throughout various parts of the Province and down south are of most encouraging character. All of them point to the attendance being on an unprecedented scale, embracing representatives of some of the largest mining corporations in the United States and Eastern Canada as well as the most eminent engineers and geologists. Mining men from B. C. who have been as far south as California and have gone into Colorado and Montana have brought back reports to the effect that in every center they visited, British Columbia's International Mining Convention was the one theme of conversation among the mining men. It is clear therefore that the efforts that have been made to embrace as large an area of country as possible in the convention have met with unqualified success.

There Will Be a Programme Worth While.

Dr. Edwin T. Hodge, chairman of the programme committee, is busy arranging the details of the various sessions and the subjects that will be discussed. Dr. Hodge, who is one of the foremost geologists and mineralogists in British Columbia, is in close touch with the men best qualified to speak on the different topics that will be scheduled for consideration and is hopeful of securing the services of men whose names are household words in the mining world both in Canada and the United States. As a matter of fact from invitation which has been extended to these men to visit Vancouver in the third week of March and, combined with the fact that the six Government District engineers of B. C. will be on the list of speakers, it will be seen that the quality of the information will be of a very high order indeed.

The fact that the district engineers will give reports on their districts should possess an unusual attraction for the up-country and interior delegates, any of whom will be put into personal contact with those officials on request, so that, if necessary, they can secure information which may not be publicly given, concerning their claims or other claims in which they may have an interest. This is a matter which those delegates should not lose sight of and make their arrangements accordingly.

A new Bill introduced in the B. C. Legislature on February 20th by the Honorable William Sloane, Minister of Mines, contemplates the creation of a Board comprising the chief inspector of mines, a representative of the mine owners and one of the coal miners.

This board will have power to apportion the Province into minimum wage Districts, to fix the wage in each District and set various conditions. All board orders will be subject to the approval of the Minister.

The abolishment of the present Board of Examiners for Mine Officials is contemplated and a Board comprising the chief inspector of mines with representatives of men and owners who will deal with the examination, not only of the mine official, but also the working miners; examinations to be held every two months. It is said this provision is made to watch more closely the employment of aliens.

The duties of fire boss are more closely defined and the protection of mines is also dealt with in the new Bill. It is to be considered dangerous if a place in a mine is found to have more than two and a half percent. of inflammable gas. Every six months every cage chains must be annealed, every three months detaching hooks must be cleaned. A hot oil bath must be given the winding ropes before installation and must be recapped every three months and must not be used more than three years for the raising and lowering of persons.

The Bill had its first reading.

VISITORS TO THE CONVENTION.

The Canadian Mining Journal, Pacific Coast Branch, F. E. Payson, Pacific Coast Manager, 507 Board of Trade Building, wishes to extend to you a hearty invitation to make every use of our office.

You will find telephone, comfortable chairs, stationary and a stenographer and we want you to make yourselves right at home.

We are doing our part to make this Convention a great succes and we hope that you will make every use of our hospitality.

PREPARATIONS RAPIDLY CRYSTALLIZED FOR THE INTERNATIONAL MINING CONVENTION AT VANCOUVER.

On March the 17, 18, 19, there will be a real live International Mining Convention held in Vancouver. There will be present at the Convention Mining Engineers and Geologists of great prominence from both Canada and the United States. There is a bare possibility that Dean Frank H. Probert of the University of California will be present. Dean Probert is now looking over mines in France and Belgium, but if he returns in time his secretary writes that he will be glad to take part in the proceedings.

President A. M. Whiteside of the Chamber of Mines, has been to Spokane to arrange for the sending of a large delegation from that District and it is expected that the Spokane District will be well represented.

The Committee in charge of the arrangements for the Convention are as follows: Advisory council, A. M. Whiteside, N. Thompson, E. T. Hodge, J. M. Lay and H. P. McCraney, Programme, E. T. Hodge, Ald. Woodside, H. P. McCraney, W. E. Bland and H. A. Turner. Exhibition, S. J. Crocker, R. H. Stewart, G. W. Pettapiece, E. T. Hodge and T. H. Crosby. Entertainment, A. Erskin Smith. Trip, I. Thomas, S. W. Miller and G. S. Craddock. Transportation, B. G. Hawkins and G. S. Eldridge. Publicity director, T. J. McIlveen. Resolutions, A. M. Whiteside, J. M. Turnbull, C. K. Campbell, Jas. Anderson (Kaslo), J. J. Warren (Trail), G. W. Wooster (Granby), and J. W. D. Moody (Britannia). Co-operation, A. M. Whiteside, Sidney (Spokane), Editor Alaska Mining Journal (Seattle), F. Starkey (Nelson), T. K. Rickard (San Francisco), and R. P. Whittaker (Denver).

VANCOUVER B. C. THE MECCA.

Seattle men are coming to the Convention about one hundred and fifty strong. President Sazullo of the University of Washington will be here. Any mining man that can get to Vancouver for March 17, 18, 19 and does not do so will miss something worth while.

Come if you can and get in touch with the big men in the mining world.

THE PAS RECORDING OFFICE.

(From "The Pas Herald.")

The Pas, Feb. 15.—The following is a copy of the wire sent to Hon. Arthur Meighen by ex-Governor Charles R. Miller of Delaware, and vice-president of the Mandy Mining company. The wire is self-ex planatory:

572 Bullitt Building,
Philadelphia, Pa., Feb. 3, 1919.

Hon. Arthur Meighen, Minister of the Interior, Dominion of Canada, Ottawa, Ontario, Canada:

We are advised of contemplated removal of mining recording office from The Pas to Dauphin, Manitoba. As The Pas is situated at the extreme southern limit of mining territory in Manitoba, removing this office to Dauphin would place it three hundred miles still further away from the mining to a section where there is absolutely no possibility of mining. This would impose delays in recording, great increase in travelling expenses, and serious inconvenience. We, therefore, most respectfully and earnestly request that the office be permitted to remain located at The Pas.

MANDY MINING COMPANY,
CHAS. R. MILLER,
Vice-President.

Mayor Finger and President Jacobsen sent a joint wire to Mr. Meighen in reply to his letter, received on Saturday last, wherein he says that a sub-agency at The Pas will prove very satisfactory, because it will have direct communication with the department. This joint wire was vigorously worded, and emphasized the absolute necessity of leaving the mining books here.

Mr. Meighen's letter to the Mayor reads:

Ottawa, Ontario,
Feb. 3rd, 1919.

Dear Mayor Finger:

Your telegram has just reached me regarding the agency of Dominion Lands at The Pas.

While the agency office at The Pas is being discontinued, it is not my intention to close up the office altogether. It will be in the future a sub-agency, and the sub-agent will be the medium of approach to the department, with the result that the people of that district will not be very greatly handicapped.

I might state that the closing of many of the agency offices in Western Canada was only done after careful consideration of the matter, and on the recommendations of the officers of the department from whom reports were received.

I feel confident that, in view of what has occurred in other districts similarly affected, the people will, before long, be quite satisfied with the action taken.

Yours very truly,
ARTHUR MEIGHEN.

The Pas, February 8th, 1919.

Hon. Arthur Meighen, Minister of the Interior, Ottawa:

Sir,—Your letter of the 3rd inst. We again protest against closing of agency of public lands at The Pas. The whole population of New Manitoba consider such action as a rank injustice to the district, as seriously detrimental to the development of the rich mineral resources. A sub-agency will not serve the prospector. He cannot afford to travel 600 miles whenever necessary to examine record. Your action in closing the office is reactionary in the highest degree. It will mean no development here, and is in direct contradiction of the government's avowed policy of reconstruction.

O. H. FINGER,
Mayor of The Pas.
J. P. JACOBSEN,
President of the Board of Trade.

Nelson, B.C., Ore Testing Plant for British Columbia.

That an effort will be made at the forthcoming session of the Dominion House of Commons to induce the Government to vote a sufficient sum to enable the establishment in British Columbia of an ore testing plant was announced by R. F. Green, M.P., for Nelson, B.C., at a meeting held in the latter city before he left for the Capital. He said that he was convinced of the need for such a plant, and he believed that it should be established at or near Nelson because, in his opinion, the Kootenays were the chief mining districts of the Province. Whether he would be able to convince the authorities on the latter point, however, was a question. The argument used in favor of Vancouver was that it could be reached by both rail and water and that, therefore, from the transportation point of view a plant in that city or in the adjacent district would best serve the whole of the Province. Mr. Green asked the support of Kootenay mining men in the effort to secure the plant for that part of British Columbia.

Special Correspondence

NORTHERN ONTARIO.

Porcupine V. N. T. Development Program.

Announcement has just been made that arrangements were recently completed for the carrying out of the development program outlined just prior to the outbreak of war, and which have been held in abeyance since that time, on the Porcupine V. N. T. Property. The company was formed by the amalgamation of the Porcupine Vipond and North Thompson, each of which had a capitalization of one and a half million shares of par value of one dollar per share. After the transfer of the old stock issue was made, approximately 750,000 shares of the capital stock of the company remained in the treasury. The development plans of the company included the sinking of the main shaft at the mine from its present depth of 600-ft. to 800-ft., with provision being made for the continuing of this working to a depth of 1,000 ft. Enlargement of the present 100-ton mill was also under consideration and plans have been prepared for increasing the capacity of the milling plant to 300 tons per day. The site chosen for the new mill is on the North Thompson side of the property. The average grade of the ore developed in the mine has shown a tendency to increase as depth is attained and, it is estimated, the ore so far blocked out will average around $10 per ton. The vein at the 600-ft. level was found to have a width of about twenty feet in places and some of the richest ore in the mine has been obtained at this level. The property is bounded on the north by the Hollinger and on the west by the Porcupine Crown mine. The outlook for the future of the mine is exceedingly bright.

Another 40 Stamps at Hollinger.

A striking example of the speeding up of operations in the production of gold in the Porcupine camp is the fact that on the first of March the Hollinger-Consolidated mining company added another forty stamps to the already large battery of ore crushers. Each stamp crushes fifteen and a half tons of ore every twenty-four hours, thus the capacity of the plant will be increased by about 620 tons per day. During 1918 the mill treated 1,900 tons daily while only running at 64 per cent. of the possible running time. It is estimated that with the pressing into use of the additional forty stamps the output of the mine will be increased about $170,000 per month. Large additional working forces are being taken on at the property and an extensive resumption of development work at the lower levels of the mine is said to be contemplated for the near future. Among other additions scheduled to be made to the plant is the installation of a 1,000 horse-power hoist and an additional 9,000-ft. compressor. During the year 1918, in spite of the great shortage of labor and high costs of production, the Hollinger-Consolidated turned out about $6,000,000 in gold bullion and developed upwards of six and a half million dollars worth of new ore, thus increasing the ore reserves by the end of the year by upwards of half a million dollars. Thus with operations making rapid headway to soon exceed the pre-war rate, it is probable the current year's production will greatly exceed that of any other similar period in the history of the great mine. It is freely predicted that many surprises are in store for the shareholders of the premier gold mine of the Dominion.

Dome.

According to late information regarding Dome Mines, it is planned to resume operations early in April, however, operations at full capacity will not be under way until the middle of May. A number of new men are being taken on at the property and underground development work on a fairly extensive scale is being proceeded with underground, being centralized in the connecting of the eight hundred and seven hundred foot levels. The financial situation of the company may be summarized as follows: — At the close of 1917 the company had a surplus of $531,948. At the end of October, 1918, the surplus was given as $265,-018, thus showing a decrease of $266,930 for the ten months. This decrease in the cash reserve was caused by the large amount of development work carried out during the period in which the mill has remained closed. It is thought the present cash surplus will be sufficient to carry the company over until the mill is again in full operations.

Silver Alliance.

The syndicate now in control of the Silver Alliance property, near Elk Lake is installing a steam plant, and it is expected mining operations will be under way in the next two weeks. A small shaft has been sunk on a vein uncovered some time ago and drifting will be proceeded with as soon as possible.

Will Improve Gowganda Road.

The Ontario Provincial Government has officially announced its intention of improving the Gowganda road, as soon as weather conditions will permit. The work will be taken up from the point where it was left off last fall, and the plans call for the expenditure of a considerable sum.

T. & N. O. Extensions.

It is reported the situation regarding the Kirkland Lake district is also being inquired into by the Government. It is stated in well-informed circles that there is a strong probability of an extension of the T. & N. O. being built this summer from Swastika to the centre of activity at Kirkland Lake, a distance of about five miles.

At the same time announcement is forthcoming to the effect that the T. & N. O. railway will push the Porcupine branch through to Mattagami Heights on the Mattagami river, at which point the Commission will construct a dock and storehouses. A steel bridge is being built over the river at the point, which will provide through traffic from Timmins to the township of Mount Joy, and the splendid country beyond.

The Government will also proceed with the construction of a roadway from the Boston Creek station to the centre of activity in the district. The Boston Creek district appears to be in line for extensive new activities during the coming spring and summer months, and the properties in an advanced stage of development are more than meeting the expectations of their interested owners.

Alexo.

During the third week in February the Alexo Mining company shipped 400,000 pounds of nickel ore. This brings the shipments for the month of February up to 1,080,000 pounds and with another week to go, it is expected the month's record will be big.

Miller-Independence.

The plans of development of the Miller-Independence property the main operation of the Boston camp to date has undergone a considerable change during the past week or ten days. In place of continuing the in-

cline shaft to a depth of 500-ft. it has been arranged to sink the central shaft some distance south of the vein. This shaft will be driven vertically to a depth of 550 or 600 ft., at which point it should encounter the vein, which is dipping at an angle of between fifty and sixty degrees. At a depth of 300-ft. a station will be cut and a crosscut driven north to the ore body, while at the 600-ft. level the vein will probably have dipped sufficiently to necessitate a crosscut to the south, later on as the shaft attains greater depth crosscutting will be carried on to tap the vein at the various levels. Sinking operations on the new central shaft were commenced to-day, and it is expected rapid headway will be made with the working.

Diamond Drilling Cotter Property.

The official figures given out on the results of diamond drilling on the Cotter property at Boston Creek, show that in a hole driven a distance of about 720-ft., dipping in an angle to the north, an orebody measuring over twenty-eight feet in width was cut at a vertical depth of 492 feet. The average gold content of vein matte amounted to $12.40 per ton. It is firmly believed this orebody is the eastward continuation of the main vein of the Miller-Independence property, and very strongly indicates that the orebody is increasing in width as depth is attained.

Boston Creek Properties Sold.

Two important mining deals were closed this week in the Boston Creek district. The McCrea-O'Neil property and the Charlebois-Authier were the ones figuring in the deals. The former property was sold for cash, the full purchase price being paid this week through the Royal Bank at Haileybury. The vendor retains a small interest in the property. A substantial cash payment was made on the Charlebois-Authier.

The McCrea-O'Neil property adjoins the Miller-Independence on the northwest. The Charlebois-Authier property adjoins the Cullen-Renaud on the North, lying between the latter property and the Boston Gold Leaf mine.

Working forces are being engaged at once and the erection of camp buildings will be completed before the spring arrives, which will be followed by an aggressive campaign of development. The purchasers of both properties George Morris of Allan and Morris, Building Contractors of Buffalo. It is also understood that E. L. Wettalufer of Buffalo is associated with the purchasers.

Canadian Kirkland.

A small steam plant is being taken in to the Canadian Kirkland Gold Mines property, preparatory to the commencement of more extensive development work. Owing to the death of Mr. George E. Drummond of Montreal, the date of commencing mining operations has been temporarily deferred, but the delay is expected to be of short duration. An interesting feature in connection with the Canadian Kirkland property is the fact that where commercial ore has been developed, the ore has been found to contain greater values in silver than in gold. While each of the mines in Kirkland Lake camp produce a good deal of silver, sometimes amounting to as much as ten per cent., there appears to be no other instance on record in the camp where such a high percentage of silver is contained in the ore.

Adanac.

The Adanac Mining company has just completed the shipment of another 100 tons of ore to the Dominion Reduction plant at Cobalt for treatment, this shipment is just double the size of the one recently made. As the ore was broken a good deal of high grade was bagged and the shipment just made is expected to be of a medium grade, the former shipment of very similar ore having averaged close to $50 per ton. The high grade bagged, of which there was a considerable quantity will be disposed of later. In the meantime the ore deposition is being found to be more extensive than was at first supposed and as stopping operations are continued it is becoming more and more apparent that a big future is opening up for the Adanac.

BRITISH COLUMBIA.

The Vancouver Convention.

Dean Frank H. Probert, of the University of California, is mentioned as likely to be one of the distinguished visitors to Vancouver, B.C., on the occasion of the International Mining Convention which takes place from the 17th to the 19th of March next. Dean Probert now is making a tour of the devastated areas of France and Belgium and, if he is back in time, will be among the delegates to this Province from the United States. His reputation as a mining authority and the information he will have obtained of conditions in Europe with reference to the problems that must be faced in regard to reconstruction are two reasons why his attendance is most earnestly sought. Burr Evans, of Placerville, Cal., also has consented to be present. He has stated in a letter to the Convention management that "it is just such Conventions as these that assist the ancient and honorable industry of mining." D. M. Riordan, of San Francisco, Cal., says that he will attend if it is at all possible and, in fact, the word, generally speaking, from California, Oregon and Washington is, that representative mining men of these States intend making a point of coming to the Vancouver Convention in force. Mr. A. M. Whiteside, chairman of the B. C. Chamber of Mines, has returned from a trip to Spokane, Wn., and reports that the Convention to have been held at that city has been called off in order that the mining fraternity of that district, as well of all the neighboring states, may throw their considerable influence into making the Conventions of Vancouver and of Nelson, B.C., a success. John D. Kearns, one of the management committee, has left for California in order to get in personal touch with the mining men of the South and of the Northwest, to the end that strong delegations may be assured and also to arrange for mineral exhibits. Nichol Thompson, another member of the committee, is going North to see that a representative assortment of exhibits are sent from Northern British Columbia districts and to enlist the support of those connected with the mining industry in those sections. In the Provincial Interior H. P. McCraney is engaged on the same business. Approximately five thousand feet of floor space is being devoted to exhibition uses. The intention is that the exhibits shall include samples of every species of British Columbia ore as well as of as complete a display of machinery incidental to mining as possible.

Ask British Columbia Government to Develop Water Power.

The effort to secure the establishment of an iron and steel industry in British Columbia has been stimulated by the report of Dr. Alfred Stansfield, of McGill University, on the feasibility of electrically treating the

magnetite ores of the Province. It has been pointed out by the members of the Legislative Assembly, as well as by local organizations formed solely for the purpose of bringing about the foundation of the industry, that the one difficulty in the way is the securing of an adequate supply of power at a rate that will make the economic treatment of the ores practicable. The answer to this is that British Columbia has plenty of water power, and that some of it should be reserved by the Government without loss of time pending the obtaining of sufficient financial backing to permit the harnessing of some of it.

This is the sum and substance of a resolution recently passed by what is known as the Victoria Re-Construction Group of the Board of Trade and the Central Iron Committee, and which follows:

"Whereas the greatest handicap in the securing of new industries for the Province of British Columbia is the difficulty of obtaining adequate power at reasonable cost;

"And whereas in the Province of British Columbia are water power capable of development for the purpose of electrical energy;

"And whereas the development and control of water powers in the Province of Ontario has been a great financial success;

"Therefore be it resolved by this joint meeting of the Victoria Reconstruction Group and the Central Iron Committee that the Government be asked to immediately place reserves upon some of the existing water powers in the Province and that they take steps for the immediate development of at least one of these water powers, having in view the absolute necessity for cheap electrical power, if a great iron and steel industry is to be developed in this Province."

The matter of providing for the development of the ore is dealt with in the following resolution:

"Whereas the Government of the Province of British Columbia has passed an Act granting a bounty upon pig iron manufactured in the Province from ores produced in said Province;

"And whereas most of the iron deposits are held in the hands of private owners, many of whom are unwilling, or owing to financial conditions, are unable to develop the same;

"And whereas it is essential in order to get an iron industry established that an adequate supply of ore should be obtainable on a reasonable basis so as to prevent the failure of such plants or plant on account of shortage of ore;

Therefore be it resolved by this joint meeting of the Victoria Re-construction Group and the Central Iron Committe, that the Government of the Province of British Columbia be asked to take measures at the present session of the Legislature to assure an adequate supply of ore to any iron plants that may be established and to take power to enter into mines and to remove iron ore from any claim in the Province, safeguarding the owners of such claims by payment of an adequate per ton royalty and further safeguarding them against the possibilities of labor liens or other indebtedness not contracted by the said owners."

Hon. Wm. Sloan, Minister of Mines, is giving the matters thus dealt with his consideration and also is giving attention to other representations made with a view to facilitating the early inauguration of the iron industry in the Northwest.

Exemption from Regulations.

"An Act to Amend the Allied Forces Exemption Act" has been presented to the British Columbia Legislature by Hon. Wm. Sloan, Minister of Mines. It provides for a further extension of the privileges of exemption from certain of the mining regulations of the Province, to members of the allied forces. Protection under the present Act is furnished soldiers and sailors who are with the colors "during the continuance of the present war and for a period of six months thereafter." The amendment the Minister proposes will change this to read "until the 31st day of March, 1920." The reason for this is simple. If a formal peace treaty were to be signed in April or May, protection to mining men of the Province would continue only until the month of October or November following. It would be impossible to extend the provisions of the Act then because the legislature does not meet until the next January and February. Thus it might be that many cases would develop where men, properly entitled to exemption, would not be returned to civil life in time to take up their mining obligations and it would be outside the power of the Government, without the endorsation of the Legislature, to provide the necessary relief. The further extension, therefore, is proposed with a view to anticipating any such possibility. It may be said by way of explanation that the Allied Forces Act of British Columbia applies to any person who, since August 1914, has joined for service in the present war, whether by voluntary enlistment or through being mobilized; it provides that the man's Free Miner's License, the legal rock upon which all his mining holdings stand, shall be continued in force; that the soldier's assessment work on any claims he may possess shall be deemed to have been done; and that it provides for the laying over of Placer Mining Claims and Placer Mining Leases or interests therein held by members of the Allied Forces, In short, it stipulates that there shall be a general suspension of the ordinary mining regulations insofar as the interests of men who left to fight the battles of the country are concerned.

Ainsworth and Slocan. — The Standard Mine is maintaining about 25 men on development. The Standard Mill is operating on one shift basis and is handling ore from the Echo Mine. The Silver Bell Mine situated on the south fork of Kaslo Creek has made an initial shipment of high grade ore. Reports from the Silversmith Mine, Sandon, are that the ore, which gave signs of pinching out, is showing up again and prospects are brighter. The concentrating plant at Alamo, which has been re-built by Clarence Cunningham, is expected to be ready for operation by the 1st of March. Development proceeds on the Wakefield Mine above Silverton, recently acquired by Mr. Cunningham. Some high grade galena is said to have been shown up, and a shipment of one car of ore has been made. Armstrong & Casey, who have a lease on the Galena Farm Mine, have developed some good ore and the intention is to re-open the mill as soon as it is overhauled and water becomes available. F. R. Wolfe, president of the Florence Silver Mining Co., recently paid one of his regular visits to the Florence Mine, Princess Creek. He is quoted as saying that the future of the property commercially depends altogether on the price of lead. The values of the ore are almost entirely lead, but if the price remains as it is, notwithstanding that it is very low in comparison with production costs, he thinks

there will be no difficulty in maintaining operations, production and dividends. Any further drop, however, would mean a curtailment in production. The re-built Ivanhoe Mill, which has been steadily operated for some time by the Rosebery-Surprise Mining Co., has been closed and the mill at Rosebery will be used for concentration of the ores of both the Bosun and Surprise properties. About three cars a month are being taken from the Bosun, but this apparently is not sufficient to keep the Rosebery mill going. There is not a large tonnage of milling ore at the Ivanhoe Mine at present and considerable development must be done on both the Canadian and Odams groups before regular shipments may be looked for from these sources.

NEW BRUNSWICK COAL MINES CLOSED.

Fredericton, February 21.—Practically all the coal mines in the Grand Lake mining field have been closed because of the unsatisfactory condition of the coal market.

Some 500 or more men have been thrown out of work in the vicinity of Minto alone, and the only mines that are now running are those of the Minto Coal Company.

All that keeps the Minto Coal Company's mines in operation is the fact that the company has large contracts with the Canadian Pacific Railway. The Provincial Government has asked the Federal Labor Department to arrange to have the output of other mines used on the Canadian National Railways in order to make it possible for them to operate.

COST OF COAL ON PACIFIC COAST.

Interrogated in the British Columbia Legislature as to the reason for what was alleged to be the excessive price of coal on the Pacific Coast, and particularly in this Province, Hon. Wm. Sloan, Minister of Mines, retorted a few days ago that, while the cost of coal in the Canadian West might be higher now than in past years, it had become so for reasons over which the Provincial Government had no control. Production charges had risen, and the collieries, he understood, had been forced to advance prices in order to avoid making a loss on their operations. The Provincial Government, however, have no jurisdiction in the matter. Prices to the consumer was a matter which the Dominion Government, through the Fuel Control Department, had dealt with during the War, and, as a result of an investigation into the affairs of the collieries of Vancouver Island, the latter had been given authority, in all save one case, to increase their selling rates in order that they might obtain that reasonable profit to which the investment represented by their plants entitled them. Even as conditions were, however, British Columbians and residents of the Pacific Coast generally were not badly off when quotations from other countries were considered, and in elaborating this point Mr. Sloan quoted some interesting comparative figures which follow:

Grade.	Vancouver Island.	Newcastle on Tyne.	Seaham England.	Cardiff, Wales.	Fife, Scotland.	Cumberland, England.	Dublin, Ireland.	Belfast, Ireland.
Domestic lump, best	$7.16	$20.85	$21.87	$7.98	$19.44	$7.91	$18.75	$13.44
Do., nut, second	5.40	15.80	18.22	7.74	8.50	6.82	12.96	13.20
Steam bunker, lump	7.20	24.30	21.87	9.72	19.44	7.91	....	....
Do., nut	5.97	17.58	19.44	9.32	9.18	....	....	....

BRITISH COLUMBIA COAL PRODUCTION.

The total coal production of the coal mines of British Columbia for the month of January, 1919, was 243,516 tons, which represents an increase of 31,509 tons over the production of the month of December, 1918. There was a drop in output tonnage at the Corbin (B.C.) Colliery, and Princeton (B.C.), Collieries, which was due in the former case to weather conditions, and in the latter to a fire in the mine. The loss would amount to approximately 3,000 tons.

The tonnages produced by districts follows:

	tons.
Vancouver Island	158,327
Crow's Nest Pass	72,128
Nicola-Princeton	12,811
Northern (estimated)	250
	243,516

The tonnages produced by the various collieries are as follows:—

Crow's Nest Pass.

	tons.
Coal Creek Colliery	43,335
Michel Colliery	23,839
Corbin Colliery	4,954
	72,128

Nicola-Princeton.

	tons.
Middlesboro Collieries	7,305
Fleming Coal Company	4,098
Princeton Colliery	983
Coalmont Colliery	425
	12,811
Telkwa, estimated	250

Vancouver Island.

	tons.
Canadian Western Fuel Co., Nanaimo Colliery	64,404
Canadian Colliers (D), Ltd., Comox Colliery	51,666
Canadian Collieries (D), Ltd., Extension Colliery	21,217
Canadian Collieries (D), Ltd., South Wellington Colliery	7,813
Pacific Coast Coal Mines, Morden Colliery	4,541
British Columbia Coal Mining Co., East Wellington Colliery	3,543
Nanoose Collieries, Ltd., Grant Colliery	2,697
Granby Consolidated M. S. & P. Co., Granby No. 1 Colliery	2,446

Grand Forks, B.C.—The aerial tramway, being built from the Rock Candy group (fluorspar), to the spur extension of the Kettle Valley Railway, is almost completed. When it is finished, and the last spike is driven on the railway branch, the transportation of the products of this property, which is being developed by the Consolidated Mining & Smelting Company of Canada, will be materially facilitated.

Use of Cripples in Industry

By JAMES P. MUNROE.*

(A paper presented at New York Meeting, American Institute of Mining Engineers, February, 1919.)

Appalling as has been the loss of life in the last 51 months, there is one slight compensation: no longer will there be in the world a cripple, in the old meaning of the term. Men handicapped by wounds or disease, there will be, unfortunately, and in numbers beyond what the world has known since the wars of Napoleon; but neither they nor the industries from which they were called off to war will be "crippled" in the sense in which both would have been had mankind not learned the lesson of conservation and come to understand that the most important field for such conservation is not in the forests and the mines but among men and women.

From the beginning of the Great War, France, Great Britain, Belgium and most of the other Allies have studied the problem of restoring the soldiers and sailors injured through war to physical and economic efficiency; and from their experiences, especially from that of Canada, the United States has learned much. Consequently, our task of preparing for the return of our disabled men has been easier and, in some ways, more comprehensive than theirs. Complex as are the details of the machinery which the United States has set in motion to take care of the men injured by wounds or disease, the plan itself is simple. Taught by European experience, the Surgeon-General of the Army and the Bureau of Medicine and Surgery of the Navy have provided, on both sides of the Atlantic, every known surgical and medical facility for restoring the injured or diseased man to a physical condition as nearly normal as possible. While in the hospital in France or England, on the transport coming to America, and in the hospital here, the disabled man is incited in every way to believe in his future efficiency, to want to be a normal worker, to desire to retake his place in that society of workers from which he went, temporarily, to do the greater work of preserving civilization. Furthermore, since purposeful occupation is now regarded as an essential form of treatment with most men in the hospital, especially in the convalescing stage, many of these men will have been actually started on the road to earning before they are discharged from the army surgeon's care.

As soon as it is decided that a patient is ready for discharge from the hospital—and, now that hostilities have ceased, from the Army and Navy itself—his case is certified to two bodies: the War Risk Insurance Bureau, which is to determine the amount, if any, of his compensation under the War Risk Act, and the Federal Board for Vocational Education, which stands ready to help him to get back into employment and, if he needs it, to secure a preliminary training that will enable him to make the most of himself, under the conditions of his handicap, in that employment.

The Federal Board has no authority over the man thus placed under its care; it is for him to decide whether or not he wishes to avail himself of the help that the Federal Government thus offers. But if he chooses to use the facilities tendered by the Board, there is almost no limit, within reason, to what that organization may undertake for him. Its simplest task is, of course, to assist him in getting back into his old employment; but if he has ambition to get something better or if it is apparent that, by training, he can be more efficient in what he did before, the Board has authority to give him, at Government expense, as much education as, in its opinion, it is worth while for him to have. Every endeavor will be made to train the disabled man so that not only may his handicap be overcome, but that he may be carried, through an education perhaps denied to him before going to war, to a plane of efficiency which, without this opportunity, he could not have reached. Experience in other countries has shown that, in many instances, the disabled man is, after training and despite his handicap, a much more effective man than he was before the war.

While the disabled soldier or sailor is under no compulsion to take training, there are certain incentives, besides that of ambition, which the Government puts before him. If he desires to be trained and the Federal Board believes that he will profit by it, he is so certified to the War Risk Insurance Bureau, which at once classes him as entitled, during training, to the compensation provided for cases of temporary total disability, and, during the period of training, makes specified allotments to his dependents, should he have them. If he does not pursue the course of training with due diligence, these extra compensations, on representation of the Federal Board, may be withdrawn.

Training will be carried on in public and private schools and colleges and in industrial plants under contracts made between them and the Federal Board. The period of training will be determined to meet the needs of each case, but in every instance the disabled man is to be regarded as a special problem and the instructional work given him will be fitted to his needs. It will be attempted, as far as possible, to obtain for him a position in advance of his being ready for it, so that his training may be focused upon a specific goal. Should it prove, after employment, that his choice was unwise, the Board has authority to give him further training along that, or some new line. Moreover, after placement, whether with or without training, the Board will keep closely in touch with the man until it feels certain that he is firmly established in his industrial, commercial, or professional life.

To carry out the duty placed on it by Congress, the Federal Board has established, or is establishing, headquarters in Washington and thirteen of the other leading cities of the country. As far as possible, the disabled man will be placed and trained in his own State and locality. Every effort will be made to put him into occupations that are growing, and so to train him that, when hard times come and the fervor of patriotism has passed, he will be retained, not because he is a former soldier or sailor but because he is a workman necessary to the work. Care will be taken, moreover, that he is not exploited and that he is not used as an instrument to disturb the labor situation. The complicated problems that might arise, in many States, in connection with employer's liability laws will not come up, since the number of disabled men is happily much less than it seemed probable that the United States would have.

*Vice-chairman, Federal Board for Vocational Education.

The comparative smallness of the problem in the case of men injured in the pursuit of war serves but to emphasize the greatness of the number of men and women injured every year in the pursuit of the activities of peace. By the hundreds of thousands they meet with accident and injury in every degree and form. Heretofore, most of these injured persons, so far as their economic usefulness is concerned, have been thrown on the scrap-heap of society, with anguish to themselves and their relatives, with incalculable loss to the community. The war has taught us that this waste is needless and wrong; and if a bill now before the Congress becomes law, the Federal Board will be charged with providing, in co-operation with the several States, facilities for training and retraining these victims of industry along the same general lines as those followed with the victims of war. The task will be far greater than in the case of the disabled soldiers and sailors; it will not be, as with them, a comparatively temporary responsibility. It will go on forever, as long as there are machines, carelessness, and the inevitable lapses in human minds and senses, and the problem will have many complications that do not arise with those disabled in war. But the effects of rehabilitation in the field of industry will be as much broader in their final results as the scope of the permanent and normal arts of peace is greater than that of the temporary and abnormal art of war.

Employment of Mine Labour

By HERBERT M. WILSON.*

(A paper presented at New York Meeting, American Institute of Mining Engineers, February, 1919.)

This topic was discussed at the meeting in St. Louis in September, 1917, and at the meeting in New York in February last, but in the interval the war has accentuated in measurable degree the necessity for considering human relationship, not only as between nations, or in the treatment of our returning soldiers, but with respect to the relations between labor and capital in industry. It is my firm conviction that no other subject will have so large a place in industrial and political life during the next decade as this.

Heretofore the employer has been so engrossed with the financial, mechanical, and technical aspects of his business that he has been willing to muddle through his relations with labor as best he might, and, on the other hand, the laborer has been so engrossed in his endeavors to secure a livelihood under whatever living and working conditions might be offered him that he has given little thought to his relations to his employer, until some misunderstanding has ended in disagreement and strike. No thinking man doubts that were the machinery available for friendly, personal, face-to-face consideration of the problems confronting employer and employee, there would be fewer disagreements, fewer strikes, and a better and more settled industrial situation.

The necessity for some such medium for exchange of views has resulted in the organiaztion of labor and, in some measure, of capital. Each party, engrossed only in defending its own viewpoint, has generally tried to gain its point by might rather than by right. Gradually, however, the representatives of both elements are beginning to appreciate that when the machinery for bringing them together in friendly communication is available their differences frequently settle themselves. There remain yet vast numbers of employers and of employees who are not organized and to whom the opportunity of friendly discussion of differences is not available; for these the machinery should be provided.

The subject, Employment of Labor, in so far as it applies to mine labor, may be considered under two headings: method of employment of labor and method of retention of labor. The method of treating each of these divisions of the subject will depend on the size of the mining operation. The method of employment for a large operation may be by the maintenance of a separate employment department; for small mines, there may be no employment department or organized method of employment. The method of retention of labor will be affected by the size of the operation, the conditions of employment, as to its possible future permanency, the opportunity for promotion, and the general working and living conditions.

Employment by a large mining operation through a separate employment department should be governed by definite rules and methods. The hiring of labor should be governed by classification, a personal method of interview, and by consideration of the appropriate working place, and other conditions that will affect the prospective employee. The employment and the retention of labor are affected not only by question of wages and chance of promotion, but by the conditions surrounding the work and the working place, and those connected with living opportunities. No aspect of the method of retention of the right kind of employee is more important than that which concerns the living and recreational opportunities offered near the place of employment. These have been generally treated under the titles of Safety Work and Welfare Work; the first deals with the place and conditions of the employment, and the latter with the place and conditions of living. A better knowledge of the effect of these considerations on labor and employment has convinced, without exception, every one of those employers and employees who have had personal experiencs in such matters that an improved condition of safety adds to the efficiency of a mine operation and to the comfort and well-being of the miner; and that good living conditions, including housing and educational and recreational facilities, add in equal measure to the efficiency of the mine operation and to the comfort and well-being of the miner. Both of these so-called activities tend to reduce the cost of production, to increase the earning capacity of the employees, and to make for the more permanent retention of labor, and consequently the preservation of a higher grade of labor.

I will not elaborate now on the effect of safe prac-

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*Director of the Department of Inspection and Safety of the Associated Companies.

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tices in mining on labor employment,[1] nor on the effect of welfare work on labor employment,[2] as my views on these subjects have been given in previous meetings. Other subjects connected with the main topic of labor employment, which I hope will be discussed by those better informed respecting their details, are the methods of separation, their effect on the reduction of labor turnover, and the necessity and wisdom of medical and health examinations both at the time of and during employment, and the relation of this latter inquiry to workmen's compensation costs, which latter subject I have presented in detail before your Section of the International Engineering Congress in San Francisco in 1915.

The question of separation is often one of the most difficult and most full of opportunity for misunderstanding. When either the business conditions or the personality of the employee may require his dismissal, it is necessary to decide how this shall be done in such manner as to make clear not only to the employee but to his associates that his separation is necessary. A common method is by a brusque notice of discharge; a better way would be by giving notice of one or more weeks prior to compulsory dismissal or by a personal interview with an opportunity for voluntary withdrawal within a fixed time.

A great deal of important and constructive work has been done toward the solution of the employment problem by a hundred of the larger mining corporations scattered from the Atlantic to the Pacific, notable among which are the mining subsidiaries of the United States Steel Corporation, the Republic Iron &

[1]Trans. (1917) **57**, 557. [2]Trans, (1918), **59**, 652.

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Steel Co., Nevada Consolidated Copper Co., Utah Copper Co., Cleveland Cliffs Iron Mining Co., New Jersey Zinc Co., and the Ellsworth Collieries Co. In like manner, among the smaller independent mining operations, there are many that are successfully handling this problem through the personal interest of the owner in the well-being of his employees. In this latter case the problem takes on the older paternal aspect of the subject, wherein the owner lives at his mining operation among his employees and takes a personal interest in them and in their family affairs, thereby securing to them better living and working conditions, and engendering a better spirit of friendly co-operation.

The most pretentious, and I think the most successful, recent effort to solve this problem is that begun three years ago under the personal direction of John D. Rockefeller, Jr., after the labor troubles of the Colorado Fuel & Iron Co. This effort is known as the Colorado Industrial Plan, and its success as a means of bringing about better relations between employer and employees and in securing more permanent and better labor employment conditions, appears to be amply testified to by the results of the past three years of successful operation. It is a striking example of the value of personal friendly conference, through the agency of a permanent establishment for the settlement of employees' troubles. In substance, it consists of a representative committee, selected by the miners and the owners, that meets at regular intervals to hear and inquire into the complaints of employees and the differences between employer and employee at each plant, respecting method of employment, retention, and separation. In the field of retention, this plan has adopted a most liberal attitude toward safe working conditions and satisfactory living conditions. It operates through committees on co-operation and consideration; on safety and accidents; on sanitation, health and housing; and on recreation and education. These committees have accomplished much for the betterment of the working and living conditions of the miners and their families.

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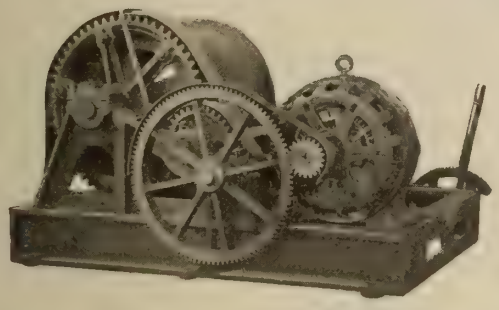

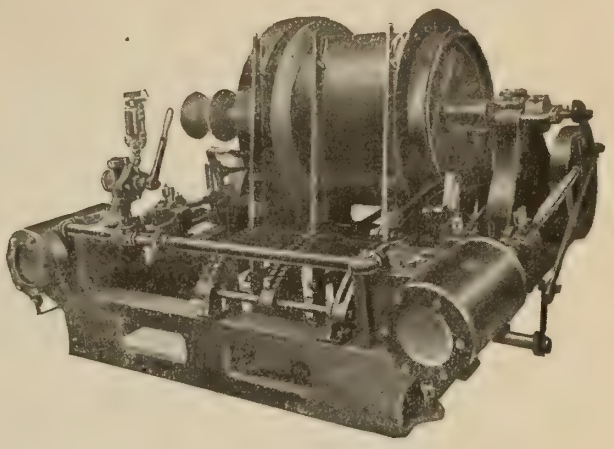

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:-: EDITORIAL :-:

ECHOES FROM C. M. I. ANNUAL.

The boys are all behind the new President and mean to give him a hearty support during his term of office.

Would it not be well to appoint a committee of Inspectors of Mines to consider accidents at each annual meeting?

The provision of safety appliances for mining inspectors might be considered as worthy of the attention of those who have charge of the next convention.

What has become of our old friend Conservation? The coy Research Council appears to have supplanted her in the affections of the members. But 'tis a fickle age!

In his address the Secretary of the Engineering Institute of Canada, Mr. Keith, expressed himself frankly and convincingly. The relations of the two institutes in the future should be most pleasant.

Mr. Dresser proved to be a real find as toast master. While we wish to see him President of the Institute before many years, in the meantime we would suggest to the Council that he be asked to become honorary official toast master.

It's too bad Cambrian was detained in the capital city. His odes in the Bulletin will not have quite the true ring for the next year. He would have found the meeting of 1919 a great inspiration for his muse. He would not need to draw on his imagination.

We believe it was due to the thoughtfulness of that good friend of the Institute, Mr. J. Stevenson Brown, that it was arranged to have the annual dinner in the Montreal Club. The members are much indebted to both the Club and to Mr. Brown. The Club was the pleasantest place in which any of the 21 dinners of the Institute has been held.

And some of the fellows have been infected with bacillum mutabile and want to change C. M. I. to C. I. M. M.! It will take an Act of Parliament to make the change, and to discard a name enshrined in sentiment, loyalty and tradition. But these are nothing—why not "keep up with the Jones"? Change Canadian Mining Institute to Canadian Institute of Mining and Metallurgy! That real mouthful, the new name of the A. I. M. E.—American Institute of Mining and Metallurgical Engineers—should serve as a warning. Then, if we make the change, to be consistent we shall have to insist on numerous other changes. The Department of Mines of the Dominion and of several of the Provinces shall have to become Departments of Mines **and Metallurgy**, with corresponding titles for the Ministers. At last accounts, the Bureau of Mines in Washington has not changed its name.

Weren't the boys glad to see Professor Kemp back again! The reception they gave him when he rose to speak at the dinner was unsurpassed.

Dr. Bradley Stoughton is another whom we all look forward to seeing at the annual gathering. We always knew on which side he was during all the years of the war. The mantle of Raymond has fallen on good shoulders.

Of course the new President of the A. I. M. E., Mr. Winchell, is a real northern zone man, as he comes from Minnesota. We all feel that he is one of us and hope that we shall see him frequently at our annual meetings.

The absence of the Hon. Martin Burrell at the meeting was regretted. Many of his old friends were expecting to see him. But Ministers of the Crown these days have especially heavy duties to perform and have to stick pretty closely to headquarters.

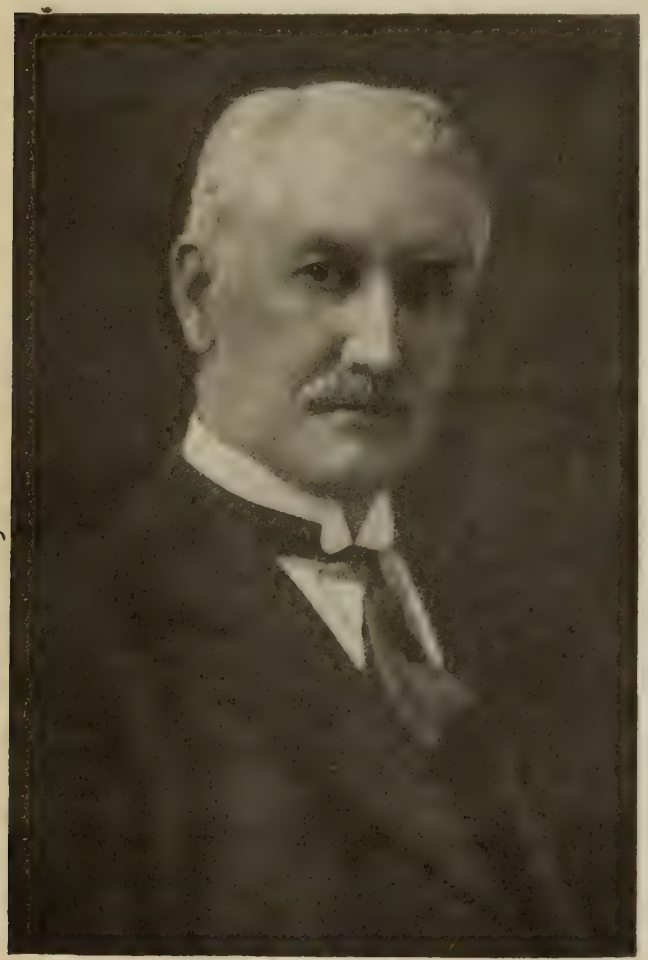
Dr. T. L. Walker of the University of Toronto and Dr. Wm. Goodwin of Queens University in the discussion on the proposal to establish a central research bureau at Ottawa, voiced the opinion of many when they stated that it would be wiser to develop the research work in the Universities. Dr. McCallum seems to be of the opinion that the Universities should concern themselves with non-economic problems. As a matter of fact, research in problems of the mining industry has already been well begun at some of our Universities.

Many regretted that formal statements of mineral production were not made at this meeting, as they have been at each of the preceding twenty annual gatherings of the Institute. According to Mr. McLeish's interesting preliminary report, Canada's mineral production in 1918 increased nearly 11 per cent. over that of 1917 and was worth over $210,000,000, or over $26 per capita, which is most satisfactory. In 1898, the year the Institute was founded, the per capita output was only $7.32; in 1908 it was $13.16. Thus the output per capita has almost doubled each ten years of the Institute's existence. One of the striking increases in Canada's mineral production during recent years is in connection with the prairie provinces. In a comparatively few years, judging from the discoveries that have been made, these provinces will also appear in the annual reports as important metal producers. Less than one hundred miles of the Hudson Bay railway to Port Nelson remain to be completed. It is not too much to hope that, when the great territories surrounding the Bay are made accessible to prospectors, very important mineral deposits will be discovered, and Canada's mineral output will be added to from this source. These territories contain rocks similar to those of the great mineral areas of Ontario, Michigan, Minnesota and other pre-Cambrian fields.

What happened to the talc producer of Madoc?

The description by Capt. L. B. Reynolds of tunneling at the front was for many the most intensely interesting feature of the splendid program. It was midnight before the audience ceased to ask questions.

Dr. Stansfield wants the metallurgists recognized by the inclusion of the word metallurgy in the name of the Mining Institute. Why not call it the Institute of geology, mineralogy, surveying, mapping, sampling and assaying, or the Institute of ore dressing and oil well drilling.



D. B. DOWLING,
Retiring President C. M. I.

Ex-treasurer Brown was very much afraid that our guests would not enjoy the program provided by certain members at the banquet. He pleaded tolerance for the men who so seldom had a chance to get in from the lonely mining districts to such a place as Montreal. He need not have been so specific. The noise producers do not all live at the mines.

The sudden change in market conditions that followed the signing of the armistice, resulted in less keen interest being evidenced in papers on 'war minerals.' A few months ago the papers on chromite by Dr. Robert Harvie and Mr. L. K. Fletcher would have been more interesting. They are, of course, valuable contributions, but, with the demand for chromite gone, the demand for information about chromite is naturally less.

Mr. Norman Fisher was present at the meeting, but comparatively few were aware of the fact. His beautiful mustache is no more.

The French evidently used to good advantage small tunnels about 2 feet by 2 feet. These stand up well when the ground is disturbed by explosions.

As Mr. Gibson says, the value of a mine is determined by the profit it produces and will continue to produce. Taxation based on mine valuation, is therefore in the end based on profits.

The New Zealanders made good records in tunneling at Arras. According to Capt. Reynolds they accomplished wonders in connecting the old galleries. They made tunnels 2 feet wide and 6 feet high.

D. H. McDOUGALL,
President and Manager Nova Scotia Steel & Coal Co.;
President C. M. I.

Professor Guess does not favor changing the name of the Canadian Mining Institute. After his experience with the passport examiner he is satisfied that the average citizen is more familiar with mining than with metallurgy.

Mr. George Mackenzie, the able representative of the Mines Branch who did practically all the work of the Munitions Resources Commission, and who, by the way, has just severed his connection with the Department to undertake the management of a Welland company, gave a well illustrated account of the prospecting work carried on by the Government in British Columbia last summer. The testing of the platinum placers were discontinued some months ago, before Mr. Mackenzie's drilling campaign was completed. Those who follow will find that a good start has been made.

Annual Meeting Canadian Mining Institute

The twenty-first annual meeting of the Canadian Mining Institute was held in the Windsor Hotel, Montreal, March 5 to 7, 1919.

An event of unusual interest was the unveiling of the Institute's "Honor and Service Roll," recording the overseas war services of members. This took place in the Rose Room of the Windsor Hotel on Thursday afternoon, and was an occasion that will long remain in the memories of members of the Institute. The ceremony was performed by Brigadier-General W. O. H. Dodds, C.M.G.

The memorial tablet is a very attractive and serviceable one. The names are engraved on bronze doors, which, when opened, disclose photographs. In a separate compartment are filled records concerning each man. To the secretary, Mr. Mortimer Lamb, belongs the credit for the design, and he is receiving many well deserved compliments. The tablet is to be given the place of honor in the council room at headquarters.

An admirable program was presented at all sessions of the meeting, but undoubtedly the subject that most intensely interested the members was the account of the work of Canadians on the Western front, particularly the work of the tunnelers. The simply told tale of the carefully performed tasks of the tunnelers was greatly appreciated.

The Institute can well be proud of the part its members played in the great struggle on the Western front. They will also profit by the technical experience gained under such unusual circumstances.

The programme for the several sessions was as follows:

WEDNESDAY, MARCH 5TH.

Morning Session: 9.30 a.m. to 1 p.m.

Presidential address by Mr. D. B. Dowling.

Appointment of Scrutineers.

Consideration of proposal to be submitted by Dr. Alfred Stansfield to change the name of the Institute.

(Chairman, Mr. Thos. W. Gibson.)

Discussion of the proposed amendments to the By-Laws.

Afternoon Session: 2.30 p.m. to 6 p.m.

(Chairman, Mr. J. B. Tyrrell.)

Presentation and discussion of the following papers:

"Molybdenum Mining," by Mr. J. C. Murray.

"Flotation Concentration of Molybdenite," by Mr. H. H. Claudet.

"The Production of Ferro-Molybdenum at Orillia," by Mr. B. C. Lamble.

"Occurrences of Chromite," by Capt. J. G. Ross.

"Occurrences of Chromite in Eastern Townships, and the Industrial Outlook," by Dr. Robt. Harvie.

"Concentration of Chromite," by Mr. L. K. Fletcher.

"The New Zinc and Lead Fields of Gaspe Peninsula," by Mr. A. Mailhiot.

"Mining Development in Northern Manitoba," by Dr. R. C. Wallace.

"Some Economic Aspects of the Falcon Lake District, Manitoba," by Mr. J. S. DeLury.

"An Investigation of Certain Canadian Platinum and Manganese Resources," by Mr. G. C. Mackenzie.

Evening Session: 7.30 p.m. to 10 p.m.

(Chairman, the President, Mr. D. B. Dowling.)

"The Operations of the British Forces in Palestine," (an illustrated lecture by Dr. H. M. Ami.)

"The Coronation Gulf Country" (illustrated), by Mr. K. G. Chipman.

"Deposits of Native Copper in the Canadian Arctic" (illustrated), by Mr. J. J. O'Neill.

THURSDAY, MARCH 6TH.

Morning Session: 9.30 a.m. to 1 p.m.

"American Institute Day."

(Chairman, Mr. John E. Hardman.)

Joint discussion with American Institute of Mining Engineers on "Principles of Mine Taxation." The subject will be introduced by Mr. R. C. Allen and Mr. Thos. W. Gibson.

Address by Mr. W. R. Ingalls on "Industrial Co-Operation."

Address by Sir John Willison on "The Re-Adjustment of Industry, with Special Reference to Mining."

2 p.m.:

Unveiling Institute's "Roll of Honour."

The ceremony of unveiling the Institute's "Roll of Honour" was performed by Brigadier-General W. O. H. Dodds, C.M.G.

Afternoon Session: 3 p.m. to 6 p.m.

(Chairman, Dr. J. B. Porter.)

Joint discussion with the American Institute of Mining Engineers on "A Uniform Mining Law for North America." The subject will be introduced by Dr. Jas. F. Kemp.

Joint discussion on "International Co-Operation in Mining." The subject will be introduced by Mr. Horace V. Winchell, President of the American Institute of Mining and Metallurgical Engineers.

"Co-Operation Among Small Mines, with a View to Increasing Efficiency of Operation," by Mr. R. W. Brigstocke.

"The Value of an Investment with Varying Yield," by Dr. A. C. Lane.

Evening Session: 8 to 10 p.m.

Evening entertainment to include moving pictures showing Canadians on the Western front; and addresses on Tunnelling on the Western front by Major R. W. Coulthard, Capt. L. B. Reynolds and other members who have returned from overseas military service.

FRIDAY, MARCH 7TH.

Morning Session: 9.30 a.m. to 1 p.m.

Iron and Steel and Metallurgical Session.

(Chairman, Mr. D. H. McDougall.)

"Some Equipment of a Modern Copper Smelter," by Mr. E. J. Carlyle.

"The Application of Pulverized Fuel in Blast Furnaces," by Messrs. E. P. Mathewson and W. L. Wotherspoon.

"Electric Smelting with Special Reference to Canadian Conditions," by Mr. Robt. M. Keeney.

"Titaniferous Iron Ores," by Dr. W. L. Goodwin.

"Iron Deposits on the Belcher Islands, Hudson Bay," by Dr. E. S. Moore.

Afternoon Session: 2.30 p.m. to 6 p.m.
(Chairman, Mr. Charles Fergie.)

"Internal Corrosion of Wire Cables and a Suggested Method for its Detection," by Mr. W. Fleet Robertson.

"A Scheme for Oiling Wire Cables in Place," by Mr. W. Fleet Robertson.

"Mining Methods at the Granby Company's Copper Mines at Anyox, B.C.", by Mr. E. E. Campbell.

"Mining Methods at the Mond Nickel Company's Mines, Coniston, Ont.," by Mr. Oliver Hall.

"Liquid Fuels, Their Uses, Production, Consumption and Sources in Canada," by Mr. B. F. Haanel.

"Experiments on the Gasoline Content of Natural Gas in Alberta," by Mr. D. B. Dowling.

"Rational Use of Coal for Power and Heat," by Mr. John Blizzard.

"The Use of Explosives for Mining," by Mr. H. Y. Russel.

7.30 p.m.

Annual Dinner in the Montreal Club, Dominion Express Building, St. James St., Montreal.

A few of the papers on the program were not presented. Mr. J. C. Murray, Dr. R. C. Wallace and Mr. J. S. DeLury were not in attendance. Dr. Wallace was taken suddenly ill on his way to the meeting, and spent the week in a Toronto hospital. Members will be pleased to learn that he has recovered sufficiently to allow him to undertake the return trip to The Pas His paper has been printed and was distributed at the meeting.

Mr. R. C. Allen and Dr. A. C. Lane were also unable to be present. Another American, Mr. H. C. Parmelee. managing editor of "Chemical and Metallurgical Engineering," presented a paper not on the program, but which in the opinion of many was one of the best things of the meeting. Mr. Parmelee discussed the industrial problem with unusual ability, and his paper will be a credit to the transactions of the Canadian Mining Institute.

Another absentee was Mr. E. P. Mathewson. The subject of pulverized fuel in blast furnaces was, however, ably presented by Mr. W. L. Wotherspoon. It was particularly gratifying to members to learn that Canadians, members of the Institute, are taking a leading part in the important new development in metallurgical practice. The kindly reference of Mr. Wotherspoon to the influence of the late David Browne in directing his attention to the possibilities of pulverized fuel was appreciated. The work of Mr. Cavers, another Canadian, and of the staff at Copper Cliff was also favorably commented on.

Mr. Fleet Robertson was not present, but his papers were presented, and will be published in due course. The paper of Mr. E. E. Campbell is not yet printed, but is said to be an exceptionally good one.

The proposed amendments to the by-laws did not meet with much opposition. There was little discussion on them. It would seem desirable that more publicity be given to the reasons for making the amendments.

The proposal to change the name of the Canadian Mining Institute to the Canadian Mining and Metallurgical Institute aroused a rather animated discussion. The objection to the proposed change is not that the metallurgists should not be properly recognized, but that there is no more reason for specifying metallurgy in the name of the Institute than for specifying any other branch of the mining industry. As pointed out by Dr. W. G. Miller, we might as well add geology, mineralogy, map making and other branches which are included under the broad term mining.

The papers presented will be published in the bulleting of the Canadian Mining Institute—some have already been published.

The Advisory Council's Program.

The program of the Advisory Council of Scientific and Industrial Research was outlined for members of the Institute by Dr. A. B. McCallum, the chairman of the Council. Considerable objection was aroused by the proposal to establish a central research bureau at Ottawa instead of developing the research departments of the various Universities. It was decided to hold a special session to discuss this proposal, and such was held on Friday morning, contemporaneous with the regular session in another room.

Dr. McCallum, at the special session, went more fully into the proposals and work of the Council, and a discussion in which a large number of members took part followed. Almost all the speakers favored encouraging research in the Universities, the research to be closely linked up with the industries of the several districts. Thus work in textiles might be undertaken at such centres of the textile industry as Toronto and Montreal, while the fishing industry would be looked after by institutions in the Pacific and Atlantic provinces.

Dr. McCallum seemed to favor the idea of having the Universities devote their attention to research in "pure" science, whatever that means. Those who are engaged in mining and metallurgy know that industrial research is being carried on in our leading Universities, and they believe that this should be encouraged rather than discouraged. They look on Dr. McCallum's porposals as an attempt to obtain Government approval for a plan which would make our University research laboratories less useful than they are. According to Dr. McCallum the public will not take their research problems to the Universities. That may be true in some industries; but it is not true of the mining industry. In any event is the Council's proposal designed to increase one's faith in our Universities?

There was this year great interest in the election for president. Mr. D. B. Dowling did not seek re-election and is to be congratulated for thus helping to put in operation what is generally regarded as a most desirable departure—the one year term. It has been so long the practice to keep a president in office for two years that no strong opposition has arisen when a president allowed his name to stand for election for a second term. At the same time there has been a growing impression that it would be better for the Institute to have a new president each year.

We cannot pass this reference to Mr. Dowling without expressing again the sympathy of mining men for him in the loss of his daughter in the influenza epidemic last fall.

To succeed Mr. Dowling two candidates were named: Mr. J. B. Tyrrel, of Toronto, and Mr. D. H. McDougall, of New Glasgow. The supporters of these two candidates did much campaigning, and as a result an unusually heavy vote was polled. The contest, a very friendly one, resulted in the election of Mr. McDougall. After hearing the address of the new president, the supporters of Mr. Tyrrell feel con-

fident that he will endeavor to carry out many of the things for which Mr. Tyrrell stood, and they will give him hearty support. Mr. Tyrrell, at the annual dinner, expressed himself as well satisfied with what Mr. McDougall said in his address. Mr. Tyrrell strongly urged that the Institute should endeavor to play a larger part in the affairs of the Dominion, and that it should take an active and prompt interest in matters affecting the industry.

President McDougall's Address.

President McDougall said:

"I have to express my great gratification at the compliment paid to Nova Scotia, and my deep appreciation of the honor conferred upon myself by your election of me as President of the Canadian Mining Institute. I shall endeavor to merit the confidence you have reposed in me by attention to the business of the Institute, and all that concerns its welfare and advancement.

"The Canadian Mining Institute, as mentioned by Mr. Hardman, its first President, in the March Bulletin, reached its majority this year, and I think all of us who have attended the sessions of our meeting this week must feel that as an Institute we are alive, virile and capable of greater things.

"Throughout all the meetings, and characterising all the papers that have been presented, there has been plainly observable a desire—nay more—an intention to utilise more completely the resources of Canada, and we must all have noticed further that it is not only the material resources of Canada that have been discussed, but the mental and spiritual forces of our people and our children.

"We welcome to our meeting eminent representatives of the mining industries of the United States, whose vast natural resources of coal and iron have materially aided the defeat of the Central Powers, knowing that behind the great material effort of the United States there was the impelling force of ideals common to the English speaking peoples, the spirit of liberty and rule by the people. We welcome you to Canada, and while we, as technical men, appreciate more than the general public the tremendous help you afforded in material effort, we wish to tell you that what we feel most deeply, and thank you for most, was your endorsation of our ideals, your recognition that our cause was righteous.

"We knew from the first that neutrality in moral questions was not possible, and felt that so soon as the Allied cause was seen by the United States to be a choice between good and evil, you would be with us—and you were.

"You have listened to the recitals of the work of our tunnelling corps—unvarnished records of work accomplished, and behind these records of professional duty, we feel the impulse of the spirit of patriotism and simple duty, that prompted men—members of our own Institute—to deeds of which they tell us very little, but as to which we can judge by the total defeat of our enemies that resulted.

"Yesterday there was unveiled a simple memorial of the war record of our members, which will always occupy the place of honor in whatever situation our Headquarters may be placed.

"You have heard papers touching upon some of the latent resources of Canada concerning the improvement of processes of extraction which may render valuable mineral deposits now considered of little account, and you have heard accounts of exploration in the far recesses of the Dominion. You have heard discussions on matters of education, of the mutuality of interests of the man who earns wages and the man who pays them, references to the new spirit that is abroad and which we must recognise or take the consequences, and all these things are evidence of the force that the Canadian Mining Institute is in our country, of our vitality, our great possibilities, and of the truth of our claim to represent the industry and its ramifications from coast to coast. I believe in the Canadian Mining Institute, am proud to be its President in the year of its majority, and it will be my endeavor to forward its interests to the full extent of my ability."

Mr. Tyrrell Advocates Greater Activity in Public Affairs.

Mr. Tyrrell, when called upon to address the members, said:

"I am here this evening as the representative of a large number of members of the Institute, a minority, it is true, but a minority that was almost a majority in the largest vote ever poled in any of our elections.

"It should be a source of pride to all that though the election was keenly contested, no unfriendly note was heard anywhere. We claim to be the Party of Progress, but after hearing the speech just made by Mr. McDougall, our President-elect, I think that we may consider him as also belonging to the same party, and that we can safely stand behind him in such measures as he may adopt for the welfare of the Institute as a whole, or of its members in particular.

"This Institute is composed chiefly of mining engineers, who are more or less responsible for the conduct and operation of the mines and metallurgical works of the country. In this capacity they are in constructive and administrative charge of great industrial enterprises. In this respect they are on a par with civil and other engineers, who are also in charge of constructive works, but there is this difference between them, that mining engineers find or produce the materials on which they operate, while the other engineers have all materials furnished to them. In fact, the enterprises with which our mining engineers are connected are part of a vast productive industry, which is second only to agriculture as the greatest productive industry in Canada, and the members of this Institute are bound by their duty as citizens to watch over the welfare of the industry with which they are so closely connected.

"No organisation in this Dominion can boast of having abler and more patriotic men than we have. Great numbers of our younger men offered themselves at once when their country called them. They gave their lives freely and quickly for the cause of civilization. We are fortunate in having some of them back with us to-night, and we are glad to say that others will soon be home, but these men who have returned or are returning gave their lives just as truly as those who rest beneath the soil in France or Flanders. They made splendid reputations for themselves, both as soldiers and engineers, so that the whole world recognizes their merit. Also the older men who stayed at home have conducted our mining and metallurgical operations with marked success.

"Our members, therefore, would be a credit to any organization, and individually no honest criticism can be offered against them. But in civil life they have

not co-operated as freely and closely as they should have done in order to obtain the most effective results, for the best results can only be obtained through close co-operation and co-ordination of effort.

"We come together at our annual meetings once every year, and we have pleasant social gatherings. They are delightful holidays, and most of our members deserve holidays after a year of more or less complete isolation at the mines. Besides enjoying ourselves, we read a few papers which are printed in our transactions, and are afterwards read by a dozen or more men who may be interested in the particular branch of the subject there discussed. We also add a little variety to our proceedings by discussing our own by-laws and endeavoring to make some changes in them. Probably interest in the by-laws is promoted by a very general feeling that the Institute ought to be more effective, and in default of any better idea the opinion becomes prevalent that it would be more effective if the rules governing it were altered.

"Although we have an organisation, the members of which are in executive control of the next to the largest producing industry of the country, the people constituting the outside public take very little interest in us, as we can see by glancing at the daily papers of this city. These papers are conducted by able, intelligent men, who see that anything good that the people will read is printed in them, and evidently the people will not care to read of our doings. Now the people elect the Members of Parliament and of the Government who govern the country, so that the Government, which is a thoroughly democratic one controlled by its electors, also takes very little interest in us. Farmers, fishermen, lumbermen, in fact men engaged in almost every other industry in the country are treated with more consideration by the Government than are the representatives of the mining industry. This should not be, and it need not be if we will co-operate and organise our forces better than we have been doing.

"It is right that we should meet here and have a pleasant time, and that we should be able to converse with each other for mutual instruction, but it is not right that we should go away from here and for twelve months lose sight of the fact that we are the rightful guardians of one of the great basic industries of the country, and that it is our duty to take on some of the responsibilities of such guardians.

"You may ask what we can do. Well, we can influence public opinion so that it will demand that in the mines as well as in other industries a man shall give honest work for a day's pay, that he shall be fairly paid for honest work, and that if anyone wishes to invest his savings in mining properties, or industries connected with mining, he will be guaranteed a fair and honest chance of reasonable returns for his investment.

"If the Government is considering the alteration of our mining laws, a committee of this Institute should be consulted, as we are the men who are most interested in the administration of mining laws, and in the results of their enforcement.

"In regard to taxes, we all know that the Government must have a revenue, and that the mines and associated industries must contribute their share of that revenue. Mining men are not slackers, they do not wish to avoid their proper proportion of the public burdens; but they should be consulted as to how a revenue can best be raised with least injury to the industry. We all know that a tax raised in one way may have a very depressing effect on an industry, while the same tax raised in another way may have but little influence on it. The members of this Institute are the men who have technical knowledge qualifying them to decide such questions and in the interest of the industry and of the country they should be consulted. As citizens of Canada they should insist that they be consulted.

"In case of disputes between miners and their employers, the rational place to look for an intelligent Board of Conciliation is among the members of this Institute, who are thoroughly familiar with mining conditions. Where is there anywhere else in Canada a group of men so capable of deciding on the merits of disputed questions in regard to the mining industry as in this Institute. Its members are the natural guardians of the welfare of everything connected with mining in Canada, and if they work together for the common good they will soon have the people and the Government in sympathy with them, and they will see development and progress on every side beyond what they ever hoped for in their most optimistic moments."

Brigadier General Dodds made many friends when he recounted the deeds of several well-known members of the Institute at the front. Needless to say, howver, no name was mentioned that stands higher in the affections of the Institute than that of the late Capt. O. E. Leroy.

Members were delighted to welcome again Professor Jas. F. Kemp of Columbia University, and to learn that his health is improving. Like Bradley Stoughton, Professor Kemp is looked upon as a "regular member" rather than as a visitor.

We missed Dr. A. C. Lane. Perhaps he had not completed his study of that problem "the value of an investment with varying yield," concerning which he was to address the meeting. Dr. Lane does not often miss a meeting of the Canadian Mining Institute.

Dr. Winchell, president of the American Institute of Mining and Metallurgical Engineers spoke a good word for mining in Canada. He has had much experience here, and he says that he always got fair treatment from the authorities.

According to prospectors who have worked in the Belcher Islands there is more good iron ore there than Dr. Moore's report would indicate. It is also claimed that the climatic conditions are not so unfavorable as Dr. Moore found them.

A rather novel method of transporting the powdered coal is in use at Copper Cliff. The coal is crushed at the reverberatory furnace plant, and forced by air to the blast furnace through a three-inch pipe.

The smelter men have of late years been making so many advances in reverberatory furnace practice that the blast furnace has become of much less importance in copper metallurgy than in the earlier years. The experiments now being carried on may result in such an advance in blast furnace work that the reverberatory will take second place again.

Confidence in the Future

The guest of honor at the banquet was His Excellency the Governor General. He was welcomed on behalf of the Institute, and was given an enthusiastic reception.

At the outset he congratulated the members of the Institute on the work they had accomplished during the three day business sessions. Although he craved their indulgence as being a mere onlooker, and not an expert, he thought there were several matters of interest on which one who was not an expert could treat.

"It is difficult to say which one of any particular industry was the dominating factor in winning the war," said His Excellency, "but unquestionably and undoubtedly primary consideration should be given to the character and determination of the people who were waging that war on our side. It is to the determination and strong character of our people, and the people of our Allies, that we must look for the determining factor in the result of the war. But even this character and this determination of the people would have been of little avail if we had not had wonderful natural resources behind us, and it is very largely due to the fact that the Allies were able, through their experience, their knowledge and their skill to turn these great resources into devices of war that we ultimately won."

Speaking of the great accomplishments during the war, he commented on the great results that will follow when all this enterprise, skill and power is turned to the task of construction.

"This is a work you, as engineers, are dealing with. This is a work which lies in front of you. We have witnessed during this period of war the most wanton and hideous waste imaginable. What we have to do now is to build up, and the only way in which we can build up is to do everything we can by wise economy and increased production. These are the problems which come before you, not as mere theorists, but as men engaged from hour to hour, from day to day, in the practical work of investigating natural phenomena, and working out their problems.

"Obviously, it is not for me, in my position, to attempt to lay down either rules of policy or rules of conduct. But certainly I may say that my experience here—very short, but if I may be allowed to say so, my very happy experience in Canada—teaches me that far greater attention ough to be paid than is paid at the present moment to research work and to the development of the natural resources of the country. And I cannot help thinking that, in facing the great problems which lie in front of us, those who are responsible for the administration and the conduct of affairs should proceed on these lines.

"Whatever money is required to be spent, that money should only be considered as an investment, and a very safe investment.

"There is one other matter to which I wish to refer to-night. Throughout the world to-day we are witnessing great upheavals. Many new theories are floating backward and forward, but it is for us now, without embarking on untrodden paths, to thoroughly recognize and realize, whether we are working with capital or working with labor, that their powers—the powers of capital and labor—lie together. We have only one object in view, and it is by cooperation, by unity and identity of purpose, by harmony, that we shall be able to achieve the best results. After all, gentlemen, that was what guided us in the war. We won the war, and we won it because all people threw their heart and soul into it. Each and everybody did his and her best, and we may all rest assured that, great as were the triumphs which were won on the field of battle, still greater triumphs can be won in the arts of peace.

"I have said on more than one occasion—and I do not hesitate to say it again—that I am an optimist. I have implicit faith in the inherent, sound commonsense of the citizens of the British Empire. We may do odd things sometimes; we may do the right thing in a very odd manner, but—I will not say invariably, because that would be egotistical—but I do say that we generally arrive at the right result.

"We have now reached the period in our history when it is time for stock-taking. We are possibly—I do not think we are, but we may be at the parting of the ways; we may be going to break into factions on one side or another. We may be going to wrangle about things which may eventually assume proportions which may very soon bring us to grief.

"I say we 'may be,' but I do not believe we 'are' going to take that course. We are going to take a higher course. We have the record of the war behind us. We know we possess great natural resources. We know we have a people of character and ability. If the fullest use is made of these resources and opportunities—and I believe the present is a great opportunity—we can look forward with great confidence to the future. You, gentleman, both in your individual and in your corporate capacity as a great institute, are closely identified and connected with many of the greatest industries of the country. You are able to take a leading and prominent part in the material development of the country's resources, and in guiding the policy and destiny of the Dominion. The responsibility is by no means a light one. But in your hands I know that it is safe."

For the first time, the members of the Mining Society of the Mining Society of Nova Scotia were present as members of the Canadian Mining Institute.

The meeting room was not a satisfactory one. The chairs were noisy, the heating poor and the lighting arrangement rotten. The program was so good that the members put up with many inconveniences with little complaint. But little credit for the success of the meeting can properly be given to the hotel management.

The serving of refreshments at the evening meeting on Thursday was much appreciated. The supply was apparently inexhaustible.

The old tunnels built centuries ago near Arras were used to good advantage by our soldiers. Apparently it was the practice of the builders of those days to excavate and build at the same time. The material for the buildings and walls came from the tunnels which were to form underground exits in time of danger. One much used tunnel was that, seven miles in length, which connected a monastry and a convent.

NOTES ON THE MINING INSTITUTE ANNUAL MEETING.

The record of progress in mining in Canada can in some measure be guaged by the nature of the annual meetings of the Canadian Mining Institute. At the meeting held this year there was abundant evidence that good progress is being made in many departments of the industry.

Production in 1918.

The reports on production presented by Mr. McLeish of the Mines Department, Ottawa, by Mr. T. W. Gibson, Deputy Minister of Mines, Ontario, and Mr. Theo Denis, Superintendent of Mines of Quebec, not only showed that the output of necessary minerals was well sustained in spite of the many difficulties, but also indicated that much has been accomplished in developing deposits that were idle when the war began.

The report of Dr. R. C. Wallace on developments in Northern Manitoba, showed that that province is to be counted on in the future as an important producer of minerals. The speed with which the deposits will be developed will evidently depend largely on what is done with the great deposits at Flinfon. If arrangements are made to build a railroad to Flinfon and erect a smelter there, the province of Manitoba will step at once into prominence. In any event, we may look for development of other properties in a smaller way.

Northern Exploration.

The excellent accounts of Mr. K. G. Chipman and Mr. J. J. O'Neill of explorations in the far north show that there are not lacking men who will endure any hardship necessary to determine what our resources are. They found no rich deposits, but they brought back information that will be of great value to future explorers.

M. E. S. Moore's account of the Belcher Island iron ore deposits was listened to with much interest. Mr. Moore is not enthusiastic over the possibilities of these deposits, but he placed on record a description of the iron formations in a part of Canada that was before the Flaherty expeditions practically unknown.

Such accounts of exploration as these of Chipman, O'Neill and Moore are indications that the Canadian Mining Institute is taking a proper interest in the development of the far north.

Gold Dust Firing of Blast Furnaces.

Of unusual interest to smelter men was the paper presented by L. H. Wotherspoon. Mr. Wotherspoon, who is consulting engineer for the International Nickel Company, gave in some detail an account of the experiments which have been carried on at Copper Cliff, Ontario. During the war there was naturally little opportunity to experiment at Copper Cliff. The furnaces were kept busy turning out the much needed nickel matter. Nevertheless, marked success was attained during the war, and now that the pressure is off we may expect that every opportunity will be given to the experimenters at Copper Cliff. We can only hope that progress will continue as successfully as the experiments indicate it will.

Mr. John Hardman's reminiscences of the early days of the Institute make good reading. The first president has always devoted much time and attention to the affairs of the Institute.

We hav'n't yet been advised by Lt.-pCol John J. Penhale, but we have no doubt that there was a branch meeting of the Canadian Mining Institute in France on March 5th to 7th.

A Hastings district branch of the Canadian Mining Institute has been organized. Mr. S. B. Upright is chairman, Geo. S. Gillespie vice-chairman and R. A. Elliott secretary.

Mr. Rickard was not present, but his paper on "The English Speaking Peoples" has been published in the Institute Bulletin, and will be read with interest by those who did not have the pleasure of listening to Mr. Rickard at the New York Meeting.

As a result of the careful work done by the tunneling companies at the front, we may expect to have important advances in the science of tunneling. There will also be available much useful and accurate information on theory and practice of explosives.

Mr. Gibson's paper on "Principles of Mining Taxation" is an important contribution. The Deputy Minister of Mines of Ontario pointed out the advantages of the profits basis for taxation. Those who have to pay taxes on mines which yield no profit will appreciate Mr. Gibson's remarks.

The discussion of "mining laws" is naturally of much interest to members of the Mining Institute for the law determines to a large extetn the activities of men. At present there is more than the ordinary interest because of propsed changes. The papers presented at the Mining Institute meeting are not yet available, but they will attract attention when printed.

The royalty clause of the mining regulations of the Department of the Interior needs revision. It is too indefinite. There is said to be no intention to charge excessive royalties but there is no guarantee that such will be the case after the miner has spent his money in exploration and development. Some limit should be fixed.

Mr. Brightstocke in his paper on co-operation among small mines touched on a matter of great importance. Too often the experience gained on ore property is not readily available for the neighbors. If owners of neighboring small mines shared the expense of securing the best technical advice there would be more progress at less cost.

Mr. Corless has to his credit many valuable contributions to the Institute. The paper on "Industry, Democracy and Education", presented at the Montreal and New York meetings is one of exceptional merit. Mr. Corless presents a strong case for industrial co-operation and education. He is an earnest thinker, and he has the advantage of being in close touch with his subject. He believes in recognizing the existence of unsatisfactory conditions and in applying his best efforts to improve conditions.

The Outlook for Mining in Northern Ontario

During the year 1918 mining was carried on as vigorously as possible in the metal mining districts of Ontario and in spite of shortage of labor and high cost of supplies a new record for production was made. The increase in value was however to a considerable extent to higher selling prices, the quantity produced being necessarily restricted.

Before the year had ended a great change took place in some branches of the industry. After the armistice was signed the demand for certain war materials faded away and the demand for common metals that have recently been used chiefly for war purposes also fell sharply.

In consequence there has been some decline in output in Ontario's greatest mining district, the Sudbury nickel-copper mines being no longer worked to capacity.

On the other hand, there has been a distinct revival of interest in gold mining. The conditions which had grown almost unbearable for gold mining companies have given place to much more favorable ones. Already there has been much improvement and the outlook is promising for far greater activity in the gold areas than has yet been witnessed. The leading gold mines struggled hard but successfully through a trying period and will immediately benefit by the changed conditions. Increase in the working forces is being made and plans for increasing production are well under way.

During the latter part of the war it was found necessary to close down some of the gold mines which could be operated profitably in normal times but not under the war conditions. These are now being reopened.

Other gold mines that have received little attention during the war will be active this year and there can be little doubt that before the year is out there will be a number of new producers on the list.

The improved prospect for gold mining has led to a revival of interest in gold properties everywhere and there is abundant evidence that there will be much exploration in northern Ontario gold areas.

The strong position of silver is greatly assisting the Cobalt silver mining companies. The decreased production of other countries is making the silver deposits of Cobalt more profitable than was expected. If the price stays near the present figure for any length of time it will be possible to market profitably a large amount of silver that would at the old prices have necessarily been left in the ground. It seems probable that there will be great activity in the Cobalt area this year to take advantage of the favorable conditions to get out low grade ore. The high price is also giving a great impetus to prospecting work which should result in further discoveries.

While the smaller demand for nickel and copper has resulted in some curtailment of output, the coming summer will be an active one at the nickel mines.

At the mine and smelter of the British America nickel company work has progressed rapidly during the winter. The Mond and International Nickel companies will have much work to do that could not be undertaken without interference with production. There may be a temporary slump in the market for nickel and copper; but the world needs these metals and the big companies will make use of the breathing spell to prepare for busy days ahead.

During the war the demand for building materials has been comparatively low. Now that a period of construction has been entered upon we may expect greater production of many non-metallic products.

Altogether the outlook for the mining industry of Ontario is very favorable. Changes are taking place rapidly and it is difficult to see far into the future, but so far as can be seen there is great activity ahead.

In Quebec during 1918 there was a large production of asbestos, pyrites, magnesite, chromite and molybdenite for war purposes. In spite of the lack of demand for structural materials the province made a new high record for mineral production. Naturally the cessation of hostilities has resulted in a great change in conditions and some of the minerals that were much in demand a few months ago are not wanted in large quantity now. On the other hand the demand for structural materials is sure to be large and will help to offset the falling off of demand for "war materials."

In the case of asbestos there is good reason to believe that the demand will continue. As Quebec is the world's chief source for asbestos and as many new uses are being found for this material, Quebec's chief mining industry is in a safe position.

Chromite mining is not expected to be very active in Quebec in the near future. Chromium is necessary for the manufacture of nickel-chrome steel and must be obtained in some quantity at all times; but it is unlikely that high prices will be obtained for for some time at least.

During the war there was developed in Quebec a great molybdenite mines. This mineral is not now in great demand, however. Nevertheless, there has been a gretaer appreciation of the value of molybdenum steel and it is probable that much more will be used in the future than was the case before the war.

PERSONALS.

Mr. Charles Camsell, head of the Geological Survey Branch in British Columbia, is in Ottawa arranging with the Geological Branch of the Dominion Mines Department, for the field work to be carried out in British Columbia during the coming season. It is understood that British Columbia is likely to be treated fairly well in this respect during 1919, thus permitting progress to be made on work which has been somewhat interfered with by the war, which took away many of the prominent young members of the Canadian Geological Survey Department. While East Mr. Camsell attended the convention of the Canadian Mining Institute. He expects to return to this Province in April.

J. K. Batchelder, superintendent of refineries for the Consolidated Mining & Smelting Company at Trail, B.C., died recently of influenza, followed by pneumonia. He was born at Wilton, N.H., on March 27, 1890, and graduated from the Massachusetts Institute of Technology, Boston, in June, 1913, in electro-chemistry. He came to Trail in August, 1913, and was in the smelter assay office from 1913 to 1915, in the zinc plant from 1915 to 1918, and made superintendent of refineries in February, 1917.

NORTHERN ONTARIO.

Companies Planning to Develop Skead Township Properties.

Five chartered mining companies are planning to do work this summer in the Skead township mining area, namely: Skead Gold Mines, Wisconsin-Skead Mines, Crawford-Skead Gold Mines, Fidelity Gold Mining Company, and the St. Paul & Minneapolis Gold Mines. The Crawford-Skead Gold Mines Company was recently organized for the purpose of operating the two claims owned by Harry Crawford, and plans have been outlined for doing considerable work this year. The Skead Gold Mines company also expects to do considerable work this summer, and is taking in material over the winter road with this end in view. Considerable surface work has been done on the properties of the other companies mentioned, and results to date have proven highly encouraging. Other property owners in the district are anticipating the performance of much assessment work in the next few months.

Ontario-Kirkland Sinking Shaft.

Although considerable delay was caused by lack of power in the early part of the current year at the Ontario-Kirkland property, the sinking of the shaft is now proceeding at a rapid rate and has already reached a depth of 150 feet. About four feet of sinking per day is being accomplished with the new electrically driven plant, which was installed during the latter part of the past year. The present plans call for the sinking of the shaft to a depth of 300-feet, where lateral work will be proceeded with. A number of veins occurring on the surface will be crosscut, and the most promising will be drifted upon. The vein on which the present shaft is being sunk is said to be still in the working at the depth of 150 feet. It is highly mineralized and the gold values obtaining are understood to be highly encouraging.

Burnside Mill in Operation.

The new mill at the Burnside property at Kirkland Lake was put in operation last week for the first time. This will add yet another small producer to the list of gold mines of the North Country, results of the first try-out of the mill having proven satisfactory. The new plant at the Burnside has a capacity of about thirty tons per day, and provision has been made in its construction for enlargement as soon as mining operations demand increased milling facilities. In the meantime the consolidation of the Tough-Oakes, Burnside and the Sylvanite continues to look promising. Such a merger would make available the 140-ton mill of the Tough-Oakes for the treatment of ore from all these properties, which are favorably situated to be economically worked under the one management.

Kirkland Lake Proprietary.

According to a circular letter recently issued by the Kirkland Lake Proprietary Gold Mines, a scheme of amalgamation and absorption of the properties and assets of the Tough-Oakes Mines, Ltd., the Burnsides Gold Mines, Ltd., the Sylvanite Gold Mines, and an important Cobalt company has been provisionally agreed to by the first mentioned company, being subject to the confirmation of their respective valuations by Mr. H. H. Johnson, consulting engineer for the Kirkland Lake Proprietary, and will be submitted for approval to the shareholders of the various companies after his report has been received. Mr. Johnson was expected to arrive in Canada last month and it was thought his report would be ready during the current month. The amalgamation should prove advantageous to all parties concerned as well as to the Kirkland Lake Proprietary, which holds a controlling interest in most of them as well as a considerable area of other claims. When the amalgamation is completed the absorbing company will own a continuous and compact block of claims aggregating over 600 acres in extent, situated in the centre of the Kirkland Lake gold field, and it is believed the results already obtained at several points on the various properties warrant the erection of a large central installation, which will insure quicker and more effective development with much lower working costs than have hitherto been possible. Active operations are now in progress on the Cobalt property and good developments are reported." This proposed amalgamation is looked upon with much favor by those interested in the North Country.

Lake Shore.

Official figures of production for the month of January at the Lake Shore Mines, Kirkland Lake, show gold bullion to the value of $45,162.42 thus establishing a new high record. The mill on the property was started on March 8, 1918, and much surprise was expressed when the first month's clean-up proved the ore treated to have averaged $23.43 per ton, which was the highest average of any gold producing mine in the Dominion. However, from month to month the grade of ore and quantity treated has shown a tendency to steadily increase, with the month just past breaking the record in both respects for year with the treatment of 1,725 tons of ore showing an average gold content of $26.12 per ton. The February figures of production will not be available until about the middle of the current month, but owing to the uniformity of production during the remainder of the year it is safe to estimate production for February at $45,000, while the output of the first week in March, which is necessary to complete the full year's operation of the milling plant may be safely given as $10,500, it will be seen that the grand total for the first year's operation of the property has resulted in a recovery of $515,892.17.

The official report for the month of aJnuary is as follows: 200-ft. level. The drift on the No. 2 vein east was advanced from 261 to 280 feet.

400-ft. level.—On No. 1 vein west the crosscut south was advanced from 20 to 49 feet. No. 1 vein west, was advanced, north branch, from 399 to 491 feet. No. 2 vein east, north branch, was advanced from 420 to 453 feet, while the south branch was driven ahead from 425 to 452 feet. No. 2 vein West was advanced from 192 to 214 feet.

The mill ran 90 p.c. of the possible running time, reducing 1,725 tons of ore and recovering therefrom $45,162.42."

McKinley-Darragh-Savage.

The new pumping equipment at the McKinley-Darragh-Savage Mines, Cobalt, is in readiness for the commencement of pumping the sands from the bed of Cobalt lake to the oil flotation plant completed last year. Formerly a bucket line excavator was used for this purpose, but the newly installed apparatus is much more efficient and will permit a capacity of 350 tons per day, thus adding to the production of this portion

of the plant. Underground work at the property is serving to produce sufficient profit to meet the dividend requirements of the company, which for a number of years have been maintained at a rate of 12 per cent. per annum, being paid in quarterly instalments of three per cent. The company has declared a regular dividend of three per cent, payable April 1st to shareholders of record March 8th. The annual meeting of the company was held March 8th.

Allied Gold Mines.

The second diamond drill hole on the property of the Allied Gold Mines, formerly known as the O'Donald property at Boston Creek, on the boundary line of the townships of Pacaud and Boston, has been started and will be driven to a depth of 600-feet. This second hole is being driven on the portion of the property lying adjacent to the property of the R. A. P. Syndicate, while the first core obtained was taken from the claim lying in the township of Pacaud and adjacent to the Patricia mine. Encouraging values were encountered in the first hole driven and further enlarged development is looked for on the property in the near future.

On the Cullen-Renaud claims, which also belongs to this company, it has been decided to continue the sinking of the shaft to a depth of 150-feet. This working has already passed the 50-foot depth, at which point results obtaining were highly satisfactory. This work will be accomplished by the aid of a steam plant, which will be replaced during the coming summer by electrically driven equipment for the more extensive development of the property.

McIntyre-Porcupine.

The big way in which the McIntyre-Porcupine Mines has been developed at the 1,000-foot level, coupled with the fact that plenty of efficient labor for construction purposes promises to be available in the near future, has given rise to reports that the milling facilities of the mine will be increased from the present capacity of 600-tons per day to 1,000-tons. This plan was under consideration at the time the war broke out and has been held in abeyance since. The orebody which provided so extensively at the 1,000-foot level has been proven to hold its width and values at a depth of 1,350-feet, and it is confidently expected will continue to much greater depth, indicating justifiable reason for great expansion at the property. Close to half a million tons of ore, which has a value of around $10 per ton has already been placed in reserve. With close to five million dollars in ore available and a large cash surplus, the mine and finances of the company are in a strong position, and reports of an early dividend disbursement appear to be well founded.

Alexo.

During the last week in February the Alexo Mine at Porquis Junction shipped three cars of nickel ore containing approximately 280,000 pounds. This compares with 400,000 pound during the preceding week and brings the total up to 1,360,000 shipped during the month.

Cobalt Silver Ore Shipments.

An aggregate of 25 car loads of ore were shipped from the Cobalt camp during the month of February, containing approximately 2,011,367 pounds of ore. This compares with 25 cars containing 1,915,128 pounds in January and is also considerably higher than the December shipments.

HOLLINGER.

According to information just at hand the Hollinger Consolidated may spend upwards of $500,000 or perhaps as much as $750,000 this year on additions to its plant and equipment. Already a total of $3,230,943 has been spent on plant and development account since 1910, and the plant has a capacity of about 2,800 tons daily. By the way the labor situation is adjusting itself in favor of the gold mines, the Hollinger is expected to be operating at full capacity within a very short time. Pointing toward this is the fact, as stated a week ago in these columns, that another forty stamps were being pressed into service.

This has led to an analysis of the situation of the Hollinger mine and company on a basis of operating at full capacity. Although in 1918 the ore treated averaged close to $10 to the ton, and the reserve of $41,000,000 were made up of ore averaging $9.15 per ton, yet in the following analysis it has been deemed best to conservatively estimate the recovery at $9 per ton.

Reserve tonnage	4,489,080
Gold content per ton	$9.15
Total value	$41,080,005
Cost per ton	$4.50
Profit in sight	$20,540,000.02
Plus surplus	$2,071,287.01

It will be noted that costs have been estimated at $4.50 per ton, whereas during 1918 they averaged $4.94 per ton. The reduction is due to the expected big decline in costs which might reasonably decline to perhaps $4 per ton or less. Therefore, the above figures which show a visible probably profits of $20,540,000.00, and a surplus of $2,071,287.01 or a total of $22,611,000.00, are the result of an exceedingly conservative analysis. They do not take into account the fact that there are an additional forty veins on the Hollinger, opened up veins might comprise a small mine in itself, or perhaps an aggregate of forty small mines added to the already enormous resources of what is so far proven on the Hollinger.

As for the output to be expected from the Hollinger, on a basis of its present milling capacity, the following is a concise summary of what may be expected.

Daily capacity	2,800 tons
Daily output	$25,200.00
Monthly output	$756,000.00
Annual output	$9,000,000.00
Daily cost	$12,600.00
Annual cost	$4,500,000.00
Annual profit	$4,500,000.00
Percentage on capital	18 per cent.

The Hollinger planned increasing its capacity to 3,800 tons daily, but the plan was deferred owing to the war. It is now considered probable this plan will be soon carried out. The following is an analysis of what might be expected, following such an enlargement to the mill:

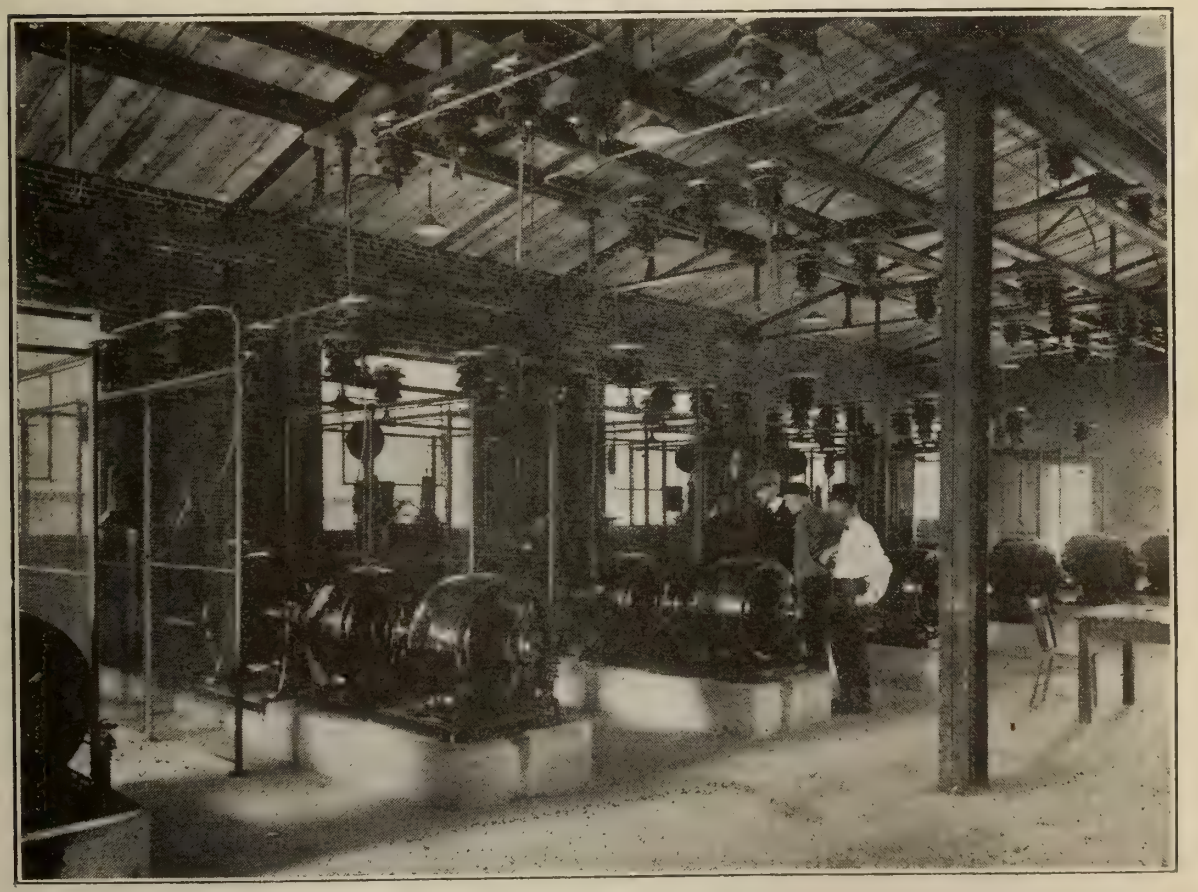
Daily capacity	3,800 tons
Daily output	$34,200.00
Monthly output	$1,026,000.00
Annual output	$12,312,000.00
Daily cost	$17,100.00
Annual cost	$6,156,000.00
Annual profit	$6,156,000.00
Percentage on capital	25 per cent.

Such conveys a concise summary of the present situation, and the future possibilities with regard to the Hollinger.

Stoping Nickel-Copper Ore at Creighton Mine, Sudbury, District, Ontario.

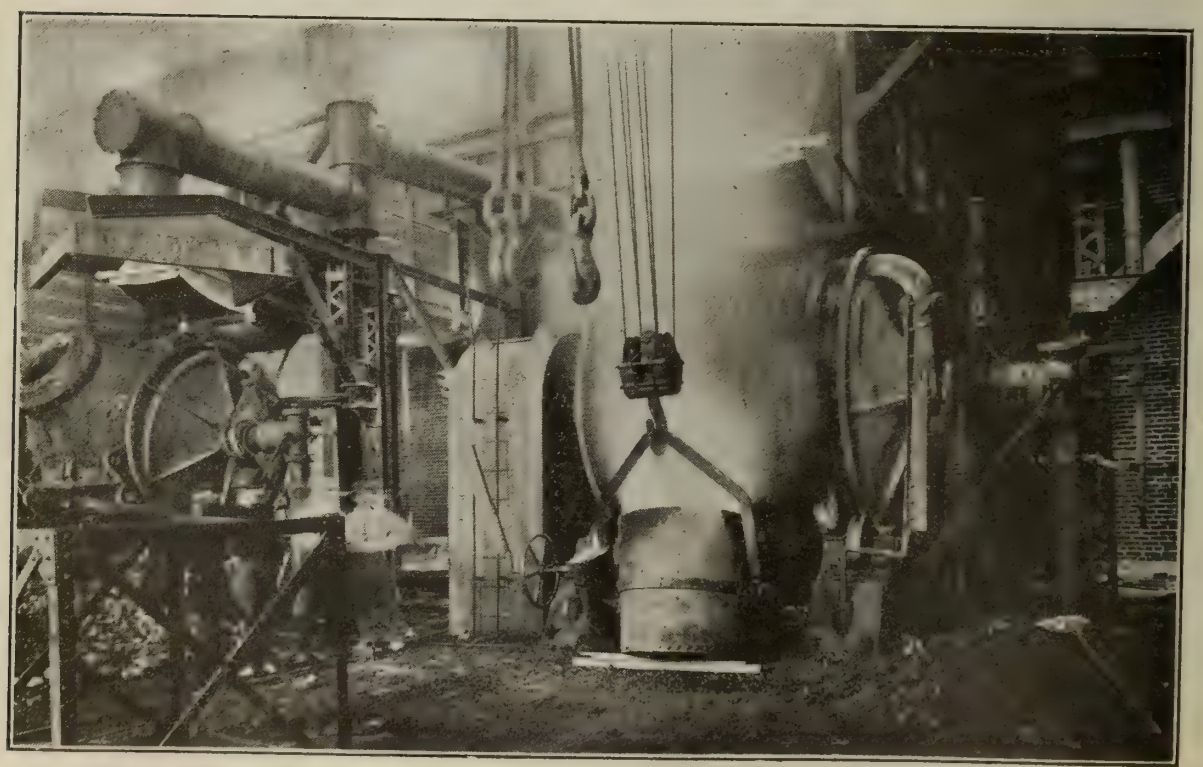
Drifting in Creighton Nickel-Copper Mine, Sudbury District Ontario.—Mining Nickel-Copper Ore in a Canadian Mine.

Pouring Copper at Port Colborne Nickel Refinery. Casting Blister into 400 lb. Blocks for Shipment to Copper Refinery.



Power House of Cottrell Dust Precipitation Plant. Refinery of International Nickel Co. of Canada, Port Colborne, Ont. Dust and Fumes are Collected from Nickel Furnace Flue Gases by High Tension Electrically Generated Here.

Copper Converters. The Cranes Used in Handling the Ladles Can Lift 50 Tons. Refinery of International Nickel Co., of Canada, at Port Colborne, Ont.



Pouring Molten Blister from a Converter into Casting Ladle After Being Separated from the Nickel.

Special Correspondence

BRITISH COLUMBIA.

Would Remove Duties on Mining Machinery.

Several resolutions of importance to the mining industry of British Columbia, in the event of their recommendations being translated into fact, were passed at the annual convention of the Associated Boards of Trade of Eastern British Columbia, which took place recently at Revelstoke, B.C.

One of these proposes that the duty shall be removed from machinery which is not manufactured in Canada. This, it is pointed out, would materially assist mining operators who are hard put to it to finance the development and the placing on a shipping basis of their properties and who, at the best, must conserve their resources to the utmost. It would mean substantial reductions on the cost of installation in British Columbia on concentrating mills and all manner of mining equipment which now comes from the United States exclusively. This resolution will be presented to the Dominion Government as expressing the sentiment of the mining communities and district of the eastern sections of the Province, and it will be pointed out that acquiescence in their wishes would not have the effect of injuring in any way the manufacturing interests of Canada.

Another suggestion which the Convention is sending forward to the Federal Administration at Ottawa has to do with the erecting and operation at different points in the province of plants for the testing and concentration of mineral ores with a view to ascertain improved methods of treating the complex ores of the Kootenay Districts and also to the end that the prospectors and operators may receive advice, without inconvenient loss of time, as to the proper equipment for the treatment of the ores of any special property in which they may be interested. Mr. F. A. Starkey, former President of the Associated Boards of Trade, in the course of a report of the year's mining and general industrial activity, told of the appointment of a committee of members of the organization to investigate the equity or otherwise of the schedule of rates charged by the Consolidated Mining & Smelting Co. of Canada at its Trail Smeltery for the treatment of custom ores. He expressed absolute confidence in the ability of the members of the Committee and of their intention to make the probe thorough and searching. It was necessary, however, that all who had complaints to make should do so without hesitation as, only by such co-operation, could those charged with the work of investigation satisfactorily discharge their duties.

Workmen's Compensation.

The coal miners of the Crowsnest Pass District, through the medium of Gladstone Local Union, No. 2314 U.M.W. of A., are petitioning for amendments to the Workmen's Compensation Act of British Columbia. They declare for a variety of reasons that changes should be made providing for the board being represented in the Crowsnest District by permanent representatives; for an increase of 100 per cent in the compensation allowed for dependents; for a clause permitting workmen to take proceedings at common law in case of serious injuries, and where it is suspected that the accident was caused by negligence; and for an amendment that will allow appeals from the decision of the Workmen's Compensation Board to the Court of Appeal.

Tudhope Electric Metals, Ltd.

A small electric furnace, designed primarily for the reduction of scrap metal, is to be installed on False Creek, Vancouver, by the Tudhope Electric Metals, Ltd. Construction has commenced and the plant is expected to be ready for operation in the course of a few months. It is likely that it will be used for the purpose of giving a practical test to the much discussed question of the feasibility of electrically treating the megnetite ores of British Columbia.

No Change in Wages at Trail.

Mr. S. G. Blaylock, Assistant General Manager of the Consolidated Mining & Smelting Company, in a recent statement asserts that there has been no change in the scale of pay at the Trail Smeltery since June 1, 1918. He explains carefully that any difference that may be found by the men in the bulk of their pay envelopes is due entirely to the recent decline in the price of metals. He then enumerates the various bonuses and their character allowed since the month of June last year.

Government Engineers Will Attend Convention.

All the mining engineers of the Government of British Columbia will attend the International Mining Convention to be held at Vancouver next month. They have been called in from their various districts for that purpose and probably each will submit a paper dealing with conditions and the future of the mining industry in the particular area over which he has supervision.

Cork Province Mine.

Arrangements are said to have been perfected for a loan of $20,000 from heavy stockholders of the Cork Province Mine, thus assuring retirement of endebtedness of $12,000, which will carry the company until shipping becomes possible in May or June. The loan is in the form of one-year first mortgage notes, bearing 8 per cent. with stock conversion privilege for half the amount. The property is situated on the south fork of Kaslo Creek, 12 miles from Kaslo, in the Ainsworth District of British Columbia. It is equipped with milling plant and flotation, hydro-electric power, sawmill, electric light system and all necessary buildings. A statement issued by the company after operations were temporarily discontinued a few months ago shows that a net profit of $12,000 monthly may be expected when operations are resumed, probably early in the month of April.

Britannia Mines, Ltd.

The Britannia Mines, Ltd., operating on Howe Sound, British Columbia, and one of the big producing mines of the province, has recently discharged many of its employees. Economic conditions rendered the reduction of the strength of the staff essential; but the company, in following the dictates of necessity, has been careful to eliminate those of its men who were of enemy alien origin. It is stated that it has dismissed 450 of this class in the course of the last few weeks, leaving about six hundred at the mines. All these are of British or Allied birth. Under an Order-in-Council recently passed by the Dominion Government, enemy aliens who are considered undesirable can be summoned before a judge named for the purpose, who may determine whether such persons should be interned as prisoners of war.

Operators Oppose Some Proposed Amendments to B. C. Act.

Representatives of the Coal Mine Operators of British Columbia waited upon the Executive Council of the Provincial Government on the 27th of February to register some objections to the amendments proposed by Hon. Wm. Sloan, Minister of Mines, at the present session of the legislature to the Coal Mines Regulation Act.

As is indicated by the summary of these amendments, which already has been published, the first change contemplated is the inauguration of a Minimum Wage Board which shall have power to fix districts in which such minimum wages as may be decided upon shall be made to apply. It is not stated, however, that the same wage shall be enforced for each district or that a minimum shall be applied to all the coal mining sections of the Province.

Such legislation, the operators assert, discriminates against the coal mining industry. They say it also discriminates against collieries, as a minimum may be applied to one and not to the other. It is "vicious," it is declared, for these reasons and because it places too much power in the hands of the Minister of Mines. Further they maintain that the establishment of a minimum wage will have a tendency to do away with contract work, under which system the coal mines of British Columbia are operated. They would have the effect of reducing production. It will, in their opinion, increase the cost of production and, the greater the cost of local coal, the larger proportion will be imported and consequently the greater the loss of revenue to the Province. The dealers, it is affirmed, were driven out of the coal market of California because of the production costs and, if it was to continue, would meet with a similar fate with regard to all the foreign markets.

Competition, it was declared, was becoming closer in the State of Washington and, when it was remembered that of the 2,000,000 tons produced in 1917 no less than 800,000 tons was exported, the seriousness of such a loss would be better appreciated. Moreover, any greater increase in production costs, which would mean beyond question a further advance in retail prices, would result in the encouragement of the replacement of coal by fuel oil. This transition was a factor which these interested in the coal trade had to face. If it persisted it simply meant that more and more capital which now was invested locally in locally produced fuel would be expended on an imported fuel and would fatten foreign profits.

Exception was taken to the proposal that the Lieutenant-Governor-in-Council should be given power by the Legislature to make such orders as may be deemed necessary from time to time for the further safeguarding of the lives of underground workers. The criticism offered was that it would result in uncertain conditions. Operators might be confronted from time to time with new regulations having the effect of disturbing their settled and smoothly working systems of management. They wished to make it clear, however, that they were anxious to co-operate at all times in all reasonable measures calculated to promote the safety of the miners. Their point was that the Provincial Executive was taking too much power to itself at the expense of the Provincial Legislature.

The delegation took advantage of the opportunity to protest, as well, against the enforcement of the provisions of the Eight Hour Act, which was passed by the Legislature in 1918, and which gives all those working above the surface around coal mines the same working day as those employed under-ground, namely, the Eight Hour Day. This law becomes effective on the 31st of next March and it was stated that, as it would tend to increase production costs, the wisdom of permitting it to remain without change should be made the subject of inquiry by commission.

There have been reports that the Provincial Government proposes increasing the tax on coal produced in British Columbia from 10 cents to 25 cents a ton. While the statement has been publicly made that such action is under consideration no pronouncement has been made from official circles. It is thought that this accounts for the fact that the operators took occasion, when meeting the Government, to submit a petition for the reduction of the present 10 cent a ton tax to 5 cents a ton. One of the arguments advanced in this connection was that in Alberta the tax is only 5 cents a ton and that British Columbia coal already comes into competition, to some extent, with that of the sister province. It also was asserted that the points already enumerated against any action being taken that would have the effect of increasing costs, which under present conditions were extremely high, applied to the question of taxation. It was essential that the burdens of the operators should not be made greater if the coal mining industry was to be maintained in a prosperous state.

The personnel of the Operators' Delegation was as follows: J. M. Savage, general manager of the Canadian Collieries (D), Ltd.; Thomas Graham, general superintendent of the Canadian Collieries (D), Ltd.; J. H. Payne, managing director of the Pacific Coast Coal Mines, Ltd.; R. M. Young, secretary of the Crow's Nest Pass Coal Co., Ltd.; R. S. Ord, manager of the Corbin Coal & Coke Co.; J. J. Grant, managing director of the Nanoose Collieries; H. Gallagher, secretary-treasurer of the B. C. Coal Mining Co.; E. N. Yarwood, representing the Canadian Western Fuel Co.; T. McNeil, secretary of the Western Coal Operators' Assn., and Mr. H. B. Robertson counsel for the Canadian Collieries (D), Ltd.

Kootenay Gold Exploration Co.

Nelson, B.C. — The Kootenay Gold Exploration Company, which operated the Granite-Poorman Mine is expected to resume operations shortly. Action has been taken towards the paying off of local creditors, and it is expected that the company named, which bonded the property from the old Kootenay Gold Company, will commence work without delay. J. J. Malone, of Nelson, is the liquidator for the latter concern.

Free Miners' League.

Prince Rupert, B.C.—The Free Miners' League of Central British Columbia, which proposes working for the advancement of the mining industry in the northern and central districts of the Province, was organized recently at Prince Rupert. Officers have been elected as follows: President, A. C. Garde; Directors, Messrs. P. R. Backus, J. C. McLennan, George Kerr, George Frizzell, J. Lorne MacLaren, and W. E. Fisher. Mr. W. C. Wilcox has been appointed secretary.

Lower Prices Necessitate Lower Wages.

Tacoma, Wn. — A number of British Columbia shipping mines, as well as other similar properties more immediately tributary to the Tacoma Smelter, have been seriously affected by the recent material reduction in payments on ore. Production in most cases has been reduced from forty to fifty per cent, and it is becoming in most instances a case of continuing operation merely for the sake of maintaining an organization that will be ready when market conditions improve. The Tacoma Smeltery is operating only one furnace, whereas it had three in blast a year ago. A reduction in the wages of employees amounting to 12½ per cent of what has been paid took effect on the 1st of March, the minimum wage for common labor being now $3.75 a day.

Anyox, B.C.—An interesting statement was made recently by the management of the Granby Consolidated Mining & Smelting Co.'s plant at Anyox, B.C., relative to the present condition of the copper market and the consequent necessity of reducing wages. It was announced that from the 1st of March the men's pay would be based on the sliding scale, which scale will be regulated by the price of copper. Certain other concessions are granted, however, which will serve to assure the workmen a good living return over the period of temporary depression, and which, in general, guarantees them just and equitable treatment.

It is pointed out that the copper market has practically collapsed, there not being a ten per cent purchase demand as compared with normal production. Copper produced at Anyox plant since October 1st is still unsold, and there is every likelihood that it will have to be disposed of at the present low market price, or less. Anyox copper in transit or on hand up to the middle of February was 16,448,000 pounds.

The company describes the subject of maintaining operations as a serious one, as each month's production, added to the amount already named, increases an already considerable burden, making the question of continuance a grave one.

In all similar periods of depression, it is explained, the policy of the company has been to keep up production, and for many years prior to 1917 the sliding wage scale, based upon the price of copper, was in operation, a method of dividing extra profits with the men who help to produce, without their having to assume any of the responsibilities of operation or the risks of loss. This was regarded as fair by both parties.

In order to assimilate the extra cost of living at the company's property, and until such time as wholesale prices are reduced, the company will pay a bonus of 50 cents a day to each man. As a further measure the company announces that it will absorb a loss at its own store of purchases made by married employees living with their families at Anyox in a flat reduction of 10 per cent on all purchases made there. It is planned also to reduce the cost of board with every two-cent reduction in the price of copper until a minimum of $1 a day for board is reached. Beginning with the price of copper at 21 and 23 cents the special 50 cent bonus will be reduced 10 cents therefrom for each 2 cent increase in the price of copper until the special provision for the present extraordinary cost of necessities is eliminated at a point where the scale rate being paid is on the basis of copper at 29 and 31 cents.

The statement continues:

"This decided action is made necessary by the resulting conditions following a world-wide disruption, over which this company or you men have but little control. It has been delayed in order to give ample time for consideration both by you and the company's executives. It is based upon the fundamentally sound principles of justice and equity between us, and an endeavor to enlist your co-operation in keeping our industry operating at a time when so many similar and Allied industries are reducing or closing down entirely. Its further effect is to resume an arrangement between you and the company which automatically, month by month, furnishes you a method of participating in the better price received for our production, but which at the same time limits your loss when adverse market conditions prevail, as is the case at the present time.

"We hope that the present conditions will be of short duration, and that the coming spring will bring an early resumption of former business on a healthy normal scale, that will afford a solution of the perplexities of re-adjustment that seems so difficult to attain just now."

Grand Forks, B.C.—The report that it was the intention of the Granby Mining & Smelting Co. to close down its smeltery at Grand Forks is not borne out by recent developments. Another furnace was blown in a short time ago, and there now are three in operation, while a notice has been bulletined at the reduction works to the effect that it is the intention of the management to "continue operations as long as possible." With the posting of this notice announcement also was made of a further reduction of 25 cents a day per man in pay, this being in accordance with the sliding scale agreement governed by the price of copper. It is stated in this connection, however, that Granby employees still are receiving 50 cents a day better than pre-war days, and there is no disposition to find fault.

Minimum Wage for Coal Miners.

There has been some speculation as to the object of the Minimum Wage section in the amendments proposed by the Minister of Mines to the Coal Regulations Act of British Columbia. The consensus of opinion is that the intention is to drive the Chinese miners out of the coal mines of the province. In a few of the mines, it is stated, Chinese are employed at the faces, which is keenly resented by the white miners. It is the opinion that if the board, which the Government would have appointed, were to fix a minimum wage in district where this condition exists the effect would be to make it as economical to the company to employ white men and, as there is no doubt that the latter are much preferred, other conditions being anywhere near equal, the Orientals would be removed. When asked whether this was the explanation of the measure, the Minister of Mines had nothing to say. That the presumption is correct is further confirmd by the fact that the contemplated Minimum Wage Board is to be given power to denote special districts to which an investigation may be applied and for which a minimum rate of wage may be fixed.

Legislation re "Closed Towns."

The Act which proposes to open to some extent what are termed "closed towns" in British Columbia, and which applies to such centres as that of Anyox, the industrial community of the Granby Consolidated Mining & Smelting Co., was explained by Hon. T. D. Pattullo, Minister of Lands, the other day in opening the debate on the second reading of the measure. He said that the provision of the Bill had already been practically brought into force as to the town of Ocean Falls, by the terms of an agreement between the Government and the Ocean Falls Pulp Company. The Bill, he said, would give the right of entry to the communities affected to the public, though the actual ground covered by the works of the company would not be open any more than it would be in any other community. Major McIntosh, a returned soldier and member for the City of Vancouver, welcomed the measure, but thought it should go further. He understood that in some, if not all of the company towns the companies carried on all the business therein. Provision should be made permitting others to engage in business, which would give the returned soldier an opportunity. He had heard that some such towns were controlled by American firms, which sold only American goods to its employees, thus barring Canadian products. Mr. J. H. Hawthornthwaite, a Socialist Member, favored the measure, stating that laboring men were indignant over the continued existence of "closed towns," wherein the ordinary privileges of British subjects were denied them. Mr. J. W. deB. Farris, Attorney-General, sympathized with the workingmen on this question, but doubted whether it was possible to go any further. Under the Land Act it was provided that the Government might take over a one-quarter interest in townsites, but it was a question whether such industrial communities could be classified as townsites under the Act. Some towns were located in such peculiar physical conditions that it would be most unjust to step in and take one-quarter of the ground, thus seriously interfering with plants on which millions of dollars had been spent. He said that, under the legislation proposed, working men could go in and organize the workers if they saw fit.

From Anyox comes the report that the contemplated Bill does not meet wit hthe approval either of the men or of the company officials. The statement attributed to Mr. Hawthornthwaite that the employees live in "slave pens" is resented strongly, it being stated that they have first-class housing accommodation. It also is pointed out that during the war Anyox sent nearly 300 men to the war, and that at the last Victory Loan Drive Anyox subscribed more than half a million dollars, having a greater per capita of subscriptions than any other point in the Dominion of Canada. Not content with its pre-war record, Anyox is taking back every returned soldier who had a position with the company at the time of his enlistment, the general order being "a place must be found for every returned man."

The cost of living at Anyox, it is stated, during the past four years has been cheaper than any place similarly situated, either in the United States or Canada, owing to the fact that large supplies are purchased and resold to employees on such a basis that every year shows a deficit in the storekeeper's accounts, which loss is absorbed by the company. It is asserted that the statement of Major McIntosh that American supplies are bought in preference to those of Canadian origin is not correct. Such a condition is said to be unreasonable when it is remembered that there is a differential of 35 to 40 per cent on duty on such supplies. A prominent company official is quoted in this connection as saying that there is not an item of purchases made by this company outside of Canada that can be filled within the confines of the Dominion. Aside from certain machinery which is not manufactured in Canada, not a penny is spent for supplies in the United States which can be purchased here."

Horn Silver Mine.

Some fine samples of gold-silver ore have been brought from the Horn Silver Mine of Similikameen Valley by Mr. E, W. Condit, the manager. This is the largest gold-silver property of the Province. Work has been in progress there for three years and, during development, the mine has paid its way, producing 45 cars of ore which were shipped to the smelter at Grand Forks. The samples referred to are mainly argentite, 86 per cent silver, and the gold values amount to one ounce to every 300 ounces of silver. The ore extracted to date is valued at $69,000. Mr. Condit states that it is the intention to install a concentrating mill at the mine.

Silversmith Mines, Ltd.

Mr. Oscar V. White has resumed his former position as general superintendent of the Silversmith Mines, Ltd. He also is acting for Mr. Clarence Cunningham in directing operations at the Wakefield mine, near Silverton.

Developments in connection with the Silversmith continue to be encouraging. In a report received by local shareholders in the Rambler-Cariboo Mines, Ltd., regarding the operations of that property from May 1 to December 31st, 1918, it is shown that the earnings were at the rate of $3,000 monthly, or for the eight months approximately $24,000 net. As this was in spite of a serious snowslide, which swept away much of the tramway equipment and necessitated two months of reconstruction, the showing is considered satisfactory. W. A. Cameron, the mine superintendent, reports as follows: "During the period covered by the report (8 months), we have mined and milled 5,400 tons of material, from which we have produced 400 tons of lead concentrates. No shipments of crude lead were made. The concentrator was in operation six months. The other two months we were repairing damages caused by snowslides last spring. Owing to the scarcity of labor and the high cost of mining there was only 200 feet of development driven. This work consists of two raises. One from 1,300 to 1,200, and one from 1,200 to the level above. In the raise from 1,200 we have opened up a nice body of mill-feed, containing very good silver and lead values. The raise of 1,300 went through some small bunches of zinc with very little galena through it. We hope to open up some more ore off this raise, carrying better lead values, but so far the ore in here has not sufficient lead in it to make it of very much commercial value. In making an estimate of the amount of ore developed, I believe we have between twelve and fourteen thousand tons of mill-feed in sight, or sufficient to keep the concentrator in operation for over a year."

MINE WORKERS CONVENTION AT CALGARY.

The annual convention of District 18 of the United Mine Workers of America took place at Calgary, Alberta, during the week February 17th to 22nd inclusive, there being 64 delegates, of whom five were Great War Veterans, present.

One of the first important questions discussed was the problem of the re-establishing in civil life of the returned soldier. In this connection it was thought that this difficulty would be simplified in a measure by the shortening of the hours of labor. Three thousand of the miners of the District had joined the Canadian military forces and there were at present, it was said, two thousand miners without work. President-elect Christopher asserted that the conditions rendered the nationalization of the industry imperative.

After considerable debate the following self-explanatory resolution was carried:

"That this Convention goes on record as demanding for the returned men of the army and naval forces. that their membership in our organizations be held continuous, and that they be reinstated at the same class of labor in and around the mines where they were employed before enlisting or taking service in the army and naval forces; also that they should be given preference of employment where men are bing employed;

"We further recommend, realizing that the interests of the mass of the returned men and that of the body of Organized Labor are identical, that the District Executive Board be empowered to enter into negotiations with the representatives of the returned soldiers to consider means whereby justice may be secured for them—the returned soldiers — not at the expense or sacrifice of the worker, but as an act of true justice on the part of the nation, and that this Convention pledges itself to support any programme or adopt any means necessary to secure that end."

There was considerable discussion as to the merits and the demerits of the contract system of labor in the coal mines. The Corbin Local Union wished the Convention to insist on the abolition of the contract system; but it was pointed out by the international delegates present that, if this drastic resolution were passed, District 18 could not count on financial or other support from the international body. Finally a compromise was reached by the Convention going on record as opposed to the contract system. It is understood too, that all the local unions of the American continent will be circularized on this question.

It is stated that any suggestion that the objects of organized labor, as represented on this occasion, might be considered of a Bolshevist nature, was resented by the majority of the delegates. While some hold advanced socialistic opinions, which they are not backward in voicing in the heat of discussion, the following paragraph contained in a statement made by Robert Livett, an International delegate, was generally endorsed:

"The first step of the present workers towards reconstruction of society must be political. By this means we will be able to settle industrial conditions on a basis which will bring a fuller and better life. Reconstruction cannot be achieved by more trade or by a six-hour day, but must be gained by control of political power; that power in the hands of the workers can stop robbery and institute the production for the use of all; reconstruction will then be complete."

It may be stated incidentally that there is a strong sentiment in favor of the withdrawal of District 18 U. M. W. of A. from affiliation with the American organization and the establishment of a self-contained and independent Canadian body.

Coal Rights on Vancouver Island.

Some interesting new facts were brought to light by Hon. William Sloan, Minister of Mines, in speaking before the Provincial Legislature to the "Settlers' Rights Act, 1918," which proposes giving those holding property within the Esquimalt & Nanaimo Railway Belt, Vancouver Island, a further opportunity to make applications for their coal rights on the land to which they have surface title. He stated that there were some forty-five or more applications for such coal rights dealt with under the Settlers' Rights Act of 1904, which measure first opened the question by legislation, and that altogether Provincial Titles had been granted to 7,166 acres of coal bearing land within the boundaries of the railway holdings on the Island. Mr. Sloan pointed out that when the railway was first given title to these Island lands it had been granted an additional 86,346 acres to recompense it for property which had been alienated to settlers prior to 1884. He stated that to repay the company for the 7,166 acres of coal bearing land taken subsequent to 1904 another 20,000 acres had been deeded to the company. Of the total 2,210,000 acres which, it was computed, was included in the E. & N. Ry. Belt it was roughly estimated that there were 356,000 acres of a coal bearing character. It followed that there still remained to the E. & N. Ry. company or its successors some 366,000 acres of coal bearing lands.

The debate on the proposed 1918 Act is still in progress, but it is considered likely that it will be carried. Under its terms the settlers, or their heirs, will be allowed to apply for the coal rights on their lands and, if successful in proving that they have a legitimate claim, will be issued Provincial Titles. All this, however, is contingent on the stand taken by the Dominion Government. The latter exercised its prerogative last year and vetoed, or disallowed, the 1917 Act which was of an exactly similar nature. The contemplated action of the Provincial Government in taking the earliest opportunity to re-enact the legislation which, apparently, is repugnant to the Federal Administration has created an interesting situation. It would seem that a determined fight has been launched between the Province and the Dominion, it being the contention of the former's Government that the Dominion is infringing the authority of the Provincial Legislature in assuming to dictate on a subject affecting nothing more than "Property and Civil Rights." Jurisdiction to handle all matters coming under that heading was clearly allotted to the Provinces under the Terms of Union.

Considerable interest is manifested in British Columbia in the stand taken by the Canadian Mining Institute in deciding to urge upon the Dominion and the Provincial Governments of Canada the necessity of establishing a higher scale of wages to the technical workers in government departments. In deciding upon this course President D. B. Dowling suggested that Canada's vast natural resources would be developed to a greater extent than before and that the mining man might be expected to come into his own in the immediate future.

Fire at Anyox Smelter.

Fire broke out on Sunday, March 2nd, at the Anyox (B. C.), smelter of the Granby Consolidated Mining & Smelting Company's plant. It started at one of the converters and spread under the force of a northeast gale to the smelter proper and the ore bins. The loss is placed at approximately $50,000. The Anyox Fire Department was successful in checking the conflagration before it got a grip which might have been disastrous in its consequence. Repairs are in progress and it is expected that the plant will be in shape to permit full operation by the 15th of the present month.

Gold Crown Mines.

The Gold Crown Mines property, which is situated at Kleanza Creek, near Usk, and the ore of which contains good values in gold, copper and silver, may be developed this year. An American syndicate, which is represented by Mr. John Willman, is negotiating with the Government for the use of the water power of Kleanza creek. The water power is leased by the Cassiar Hydraulic company, which has not been operating for two years, and it is thought likely that a transfer of the lease will be effected. The Lucky Loop Group of Claims, owned by Messrs. Moody and Lowrie, has been leased to Messrs. Seeber, Roark, and McMann, who have been working steadily all winter. They have put in a 100 ft. tunnel and have a carload of hand picked ore ready for shipment. The values are expected to run to $10 in gold and $50 in copper at present prices. On the "Old Hickory" Mine drifting is to be continued this season by Mr. A. L. Kelch, who is returning from California shortly. A 200 ft. tunnel has been driven which shows up three feet of bornite and chalcopyrite ore. Messrs. French and Thompson, of the Kitselas Mountain Copper Company are expected to instal a concentrating mill at the mine this summer which will be of value of the development of this property and a boon to the owners of smaller properties in the district.

Developing Copper Deposits on Vancouver Island.

The development of a number of promising copper properties of Vancouver Island, B. C., is to be actively continued this summer. Generally speaking the policy of operators appears to be to proceed with the opening up and the blocking out of the orebodies in sight with a view to be in a position, with the readjustment of market conditions, to take immediate advantage of the improvement. Spokane operators were in Victoria recently examining one of the East Sooke properties, which are situated twenty-five or thirty miles out of the city. They are expected to be able to reach an early decision as to investment. A quantity of high-grade ore, and a large quantity of lower grade ore, have been blocked out at the Sunlock Mine, Jordan River. Reports from the Alberni District are favorable. Very little ore is expected to be shipped this year from the Dwedney Mine, Sidney Inlet, but it has been decided to proceed with the improvement of the concentrating facilities. The enlarged plant is expected to be ready by the month of August, and the production this year will be held for more favorable markets.

Copper at Head of Gun Creek.

Lillooet, B.C.—The discovery of a copper area at the head of Gun Creek on Copper Mountain in the Mackinnon Mountain Range, is reported, and it is stated that the deposit has been examined by Mr. Charles Camsell, of the Dominion Geological Survey Department, whose account of the same will be published shortly. Mr. Camsell visited the locality last summer, and is said to have formed a very favorable opinion of its possibilities. The survey made shows an orebody 800 feet wide by 2,500 feet long, exposed to a vertical depth of 200 feet, and is estimated to contain 30,000,000 tons in the exposed portions of the orebody. The ore, the accounts say, is of a higher grade than is usual in this Province. A sale is pending which, it is expected, will mean the development of the property in a large way.

WHY CHANGE THE NAME?

There is now before the members a proposal to change the name of the "Canadian Mining Institute." Those who support the proposal say a change in name is desirable in order to indicate that the activities of the Institute cover the field of metallurgy, and they submit the name "Canadian Mining and Metallurgical Institute" as one that more fittingly covers the activities of the Institute.

Some members of the Institute who have little to do with the finding of ore deposits, their exporation, development and mining, or with ore dressing, seem willing enough to use the term "mining" in a general sense to cover everything in the mining industry except metallurgy. Some of our metallurgists like to consider their work as distinct from that of mining, and they favor the inclusion of the word "metallurgy" in the name of the Institute. The wishes of these men must be given due consideration. In fact, the desire of the metallurgists is properly the argument in favor of the proposed change. We would point out, however, that a change made to please some metallurgists may lead to unexpected difficulties.

By long custom the term "mining" has been used in two senses; first: as a broad general term concerning the whole industry from prospecting to marketing the refined product; second, in a restricted sense referring to the actual extraction of the ore. As used in the name of the Canadian Mining Institute and in most references to the mining industry and mining companies, the word includes a great variety of activities such as prospecting, mapping, sampling, stripping, equipping with machinery. developing, drilling, pumping, surveying, mining, hoisting, sorting, crushing, transporting, milling, concentrating, cyaniding, roasting, smelting, refining, etc. The processes in connection with gold, nickel and iron ore are in many respects quite different. Even greater are the differences between coal and silver mining. The terms coal mining, silver mining, nickel mining, are used to cover all the processes leading up to the preparation of coal, silver and nickel for the market.

It would, perhaps, be well if the word mining were not used in a special as well as in a general sense. Since it is so used, however, we may as well recognize the fact. We certainly need one word for the industry, and every attempt to decrease the certainty of the meaning of that word is objectionable. If we change the name Canadian Mining Institute to Canadian Mining and Metallurgical Institute we may please a few metallurgists; but we will have to find a new name for the mining industry. As soon as the word "metallurgy" is added to the name, the meaning of the word "mining" is changed. We have a useful and all inclusive name that covers all branches of the industry from oil well drilling to blast furnace practice. Should we give it up?

Principles of Mining Taxation*

By THOS. W. GIBSON.

The object of taxation is the raising of a revenue. Unless a tax accomplishes this, it is a failure. The right to take for public purposes a part of the moneys obtained from the carrying on of private enterprises is an attribute possessed only by a lawful government, and may indeed be called the supreme attribute of government.

In free, democratic communities this power must of necessity rest upon the just consent of the governed. Powers imply obligations, hence it is obviously the duty of a government in framing a system of taxation to provide one which, while effective in producing a revenue, is also just and impartial. It will be conceded that mines and mining property ought to bear a fair share of the public expenditure. The question is, upon what basis taxation should proceed.

Two separate taxing principles are usually contended for: (1) Taxation should be proportionate to the benefits received by the person or property taxed; (2) Taxation should be based on ability to pay.

A third is sometimes added; (3) Taxation should have reference to the extent and value of the natural resources enjoyed.

As applied to mining taxation, it is pointed out by those who support the first-mentioned basis, that mines being usually situated in rocky and hence sparsely peopled regions, mining companies are frequently obliged to construct roads, railways, telegraph and telephone lines, schools, water and sewerage systems, and many other amenities and conveniences of civilization, the cost of which in regions better suited for agriculture and consequently more thickly populated, has either been defrayed locally, or can be spread over a sufficiently large taxable group of people to materially lighten the financial burden on the mine. The mining company, it is argued, having made these outlays, should receive credit for them, and be relieved of taxation to a corresponding extent.

There may be some force in this contention, but the situation is capable of relief without attempting to place taxation upon so unworkable a basis as the value of benefits received. Who is to be the judge of these benefits, and how are they to be valued? The very existence of a mining company, and its ability to carry on business in peace and security, depend upon the prevalence of law and order, which is a result of good government. The state provides protection against violence, and courts of law for redress against wrong. The relationships among the social units of a modern well-governed state are so complex and interdependent as to make it impossible to fix with any degree of accuracy the money value of the services rendered by the whole, or in other words, the government, to any one unit.

Again, the state existing for the benefit of the individual units and extending its care and protection to all, it follows, in so far as property is concerned, that the greater the value the larger are the benefits which its owner derives from the state, and consequently the greater the tax he should pay. It would seem, therefore, that basis No. 1—benefits received—really occupies the same ground as basis No. 2, ability to pay.

The latter basis pre-supposes the possession of capital productively employed, for it is obvious that taxes could not long continue to be paid out of capital which remained unreplenished. Any tax upon legitimate industry which diminishes the amount of capital available or necessary for that industry is objectionable, for the reason that its effect must be to cripple, or in the end even to extinguish such industry. Moreover, the only source out of which an unremunerative enterprise can pay taxes is its capital. These considerations bring us at once to a recognition of the fact that the burden of taxation can properly be placed only on net earnings or profits.

Adverting to the third ground for taxation previously mentioned, namely, the value and extent of the natural resources owned or controlled, it is clear that this is a suggestion for the taxation of monopolies. Natural resources, though great, are limited, and cannot be equally enjoyed by all. A water power easy of development and capable of supplying electric current for a considerable body of people, becomes, let us say, the property of an individual or company. The owner being without competitors, is able to raise his charges to the highest point, which would probably be the level at which energy could be generated by steam or brought in from elsewhere. Few will deny that such profits are a fair subject of taxation.

In a real, though not in so complete a sense, the possession of a valuable deposit of ore constitutes a monopoly. All land does not contain mineral values; indeed, the proportion of valuable mineral land to the entire surface of the earth is very small, and the owners of mineral deposits are monopolists in the sense that they enjoy this advantage over the great majority of their fellow beings. Where such advantage enables them to make unusual profits, taxation is amply justified.

In the case of basis No. 3, what is really put forward for taxation is not so much the monopoly, real or fancied, as the profits which it ensures to the owner, and its application logically leads to the same conclusions as those drawn from basis No. 2, or even basis No. 1.

Now, mining is a business more than ordinarily subject to uncertainty of result, and if the capital invested in a mine is to be in danger of serious depletion by means of taxes, because "Dame Fortune's fickle smile" has not been won, the effect will not only be disastrous to the particular mine, but deterrent upon the engaging of capital in mining enterprises generally. On the other hand, it is true that mines are sometimes profitable on a scale far beyond that of an ordinary commercial business. I need not stop to multiply instances. The copper mines of Michigan, Montana and Arizona; the silver bonanzas of Virginia City and Cobalt; the gold mines and diamond diggings of South Africa, and the nickel deposits of Sudbury, will occur to your minds. Returns such as accrue from deposits like these are the sustaining force of the mining industry, and enable

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it to maintain a vigorous existence despite countless gross proceeds. These include wages of labor, superintendence, power, explosives, timber, transportation, expenses of marketing, administration, and similar charges. Depreciation of mine buildings and plant should be allowed for, on a basis that will amortize their cost during the lifetime of the mine. Mining machinery is valuable only so long as the mine is in operation; when the ore is exhausted it rarely has more than a scrap value.

Initial capital really invested, carefully distinguished from water, should be exempt from taxation, as until it is returned either in dividends or some other form, profits in the strict sense of the term cannot begin. By initial capital is meant the money invested in purchasing the land from the government and in opening up and equipping the mine. It is apparent that should the property be subsequently sold for a larger sum, it would not be equitable, so far as the state is concerned, to treat the additional cost to the new owner in a similar way, for the increase in value simply represents a capitalization of future profits, the express object of taxation.

Opinions may differ as to whether dividends to shareholders should be reckoned among the expenses of operation, and so go untaxed. It is not the practice of shareholders to refrain from dividing the profits of a paying mine until the entire capital investment is amortized, but rather to require a distribution to begin at the earliest possible moment. Prudent management, in most cases, will be satisfied if a yearly sinking fund is provided sufficient to wipe out capital before the exhaustion point arrives, and there is no unfairness in the state's request to be treated on the same basis as the shareholders themselves, and to require its tax to be paid out of the gross sum of net earnings, irrespective of dividends altogether. It may happen that the company instead of distributing its profits in dividends, will reinvest them wholly or partially in enlarging its operations or in new or improved machinery and equipment, or even in the purchase of additional properties. The destination of profits or the purposes for which they are used, being wholly within the control of the company, should not affect the right of the state to its share.

A more fundamental question in dealing with mining taxation, whether on the net profits, ad valorem, or any other plan, is provided by the fact that the assets of a mine are in the nature of things vanishing assets. The first bucketful of ore raised from a mine marks the beginning of the end. The rich storehouse which it has taken nature ages to fill is ransacked by man in a few years. Fairness requires that this special feature of the mining industry should be given full weight in any system of taxation.

This would not be a difficult problem if the end could be foreseen from the beginning, and if the years of a mine's life could, like those of a man's life, be estimated by actuarial methods. Borings, shafts and cross-cuts, in the case of large homogeneous masses such as bodies of iron or copper ore, may give reliable data for such a calculation, but in many cases these methods, besides being expensive, are difficult of application and uncertain in results. Besides, while the drill is at work and reserves are being blocked out, ore is being raised and treated, shareholders are clamoring for dividends, and the state is asking for taxes. The most that can be done in many instances is to make a conservative guess and proceed accordingly, subject to adjustment as development goes on.

The practical problem, however, for taxation and dividend purposes, is not how long will the mine last, but how soon can the initial capital investment be recovered? After such recovery, the entire net proceeds of the mine may safely be regarded as profit and treated accordingly.

Usually, it will be the part of wisdom to make the period for capital replacement as short as possible. Pressure for returns is imperious and not to be resisted, consequently it is not the usual practice of companies to amortize formally their capital out of net earnings, but rather to pay these out as dividends. The effect of large dividends on the market value of shares is usual practice of companies to amortize formally their capital paying mining companies, is almost invariably too high, since investors overlook the fact that a mine, unlike a farm, cannot be worked forever.

It is sometimes urged that the taxation of profits should be equated over a period of years so as to avoid heavy fluctuations of revenue, which are inconvenient to the state or local body, dependent upon mine tax receipts for financing. It should be remembered, however, that especially in precious metal mines, the rise and decline of a property cover usually a comparatively brief period. A mine can best pay a large tax when it is earning large profits, but when the end is in sight and profits dwindle, the ability to pay is lessened. The adoption of a 5 or even a 3-year term, would undoubtedly tend to shift the high point of taxation to a later period in the mine's history, and might entail a burden on the closing years which they could not rightly bear. On the whole, it seems advisable to close the account at the end of each year.

The net earnings or profits basis for taxation appeals to the sense of fairness. If the mine is a failure, the state receives nothing; if moderately successful, the state gets a moderate return; if it proves a bonanza, the state revenue benefits accordingly. The incidence of taxation is better adjusted than under any other form. Experience has shown it to be acceptable to the mining community itself, which is a strong recommendation. The taxing authorities must of necessity be clothed with sufficient powers of enquiry and examination, and adequate penalties provided for offences. Given these, the difficulty of enforcement is reduced to a minimum.

The fact is that in any method of mining taxation, excluding those which are admitted arbitrary in their nature, the underlying principle is taxation of profits. This is borne out by an examination of the ad valorem system in vogue in many states of the Union.

State Constitutions almost invariably have imbedded in them a provision that all properties shall be assessed for taxation, and that taxation shall be uniform. This provision precludes any method of taxation avowedly based on output or profits, as well as a specific tax of any kind on mining property or products. In a few of the states the constitution permits specific taxes, but the prevalent basis of taxation is the assessed value of tangible property, to which a uniform rate of taxatian is applied. Ordinarily, the requirement is for assessment at the actual value, but in practice this provision is disregarded,

and in most cases the assessment value is less than the real value. Some states have regularised this disregard, and provide that the assessment shall be for only a specified percentage of the actual value. The valuation is made by the local taxing authorities, and is the basis upon which is levied both state and local taxation.

Many states have now a State Tax Commission, also a Board of Equalization, which may or may not be the same body. The assessment of mining properties by local officials is naturally far from uniform, and the function of the Equalization Board is to adjust the valuation to a common standard. It is obvious that while within the area of a local taxing unit, be it town, city or county, if the same rule of assessment be applied to all properties, it is a matter of indifference whether the basis is 50 per cent, 75 per cent, or the full actual value, for the same rate is applied to all. For purposes of state taxation, however, it would be inequitable to collect the same rate on properties in a town assessed at 50 per cent or 75 per cent of their value, as upon properties in another town appraised at their full value, hence the necessity for the process of equalizing.

But even in estimating the amount at which a mine of any magnitude should be valued for taxation purposes, it is evident that a degree of skill and experience is required, little likely to be possessed by the local assessor. Mere guessing at the value produces endless confusion and irritation. In some of the states of first-class mining importance, notably Michigan and Minnesota, the Tax Commissioners determined to adopt some more scientific method. The Michigan mines are of iron and copper. The ore-bodies are extensive and valuable. Local conditions, chiefly the fact that the mines are confined to the northern peninsula, and the farming lands of the state to the lower peninsula, led to perennial dispute as to the share of taxation which the respective sections of the state should bear. In 1911 the State Tax Commission employed Mr. J. R. Finlay to survey and value the iron and copper mines for assessment and taxation purposes. In making this valuation, Mr. Finlay applied five factors:

1—The tonnage of ore contained in the mine.
2—The estimated life of the mines.
3—The cost of operating.
4—The annual receipts from sales of ore.
5—The rate of interest for ascertaining the present value of deferred production.

The diamond drill is the distinctive tool for exploring the iron mines of Michigan. Most of the mining companies who have been operating for any length of time had delimited their ore bodies by borings, and had ascertained their approximate dimensions, and consequently the reserve tonnage. Their average production during the four or five years previous, divided into their ore reserves, gave the probable life of the mine. Operating expenses deducted from receipts from ore sales gave the profit per ton; this figure, multiplied by the average output, gave the yearly profit, or in other words, constituted an annuity payable until the mine was worked out. The present value of this annuity, discounted at six per cent, Mr. Finlay set down as the valuation of the mine for taxation purposes. Taking a concrete case for clearness' sake, let us assume that Mr. Finlay was valuating the Ferrum mine. On the basis of the company's borings and allowing for probable undiscovered ore, the contents were 10,000,000 tons. The average production was 500,00 tons a year, hence the mine had a future lifetime of 20 years. The average cost per ton for operating was $3.00, and the average for ore sold $3.50, leaving a profit of 50 cents per ton; this, on 500,000 tons of ore, would give an annual profit of $250,000 for twenty years, the present value of which was $2,867,475. This sum would be the valuation of the Ferrum mine.

Iron mining in Michigan has had its ups and downs. In 1914, when the great struggle of the nations broke out, the average loss per ton of ore to the mining companies was $0.07712, yet the taxes collected from them, based on Mr. Finlay's valuations, were equal to $0.12009 per ton. In 1915 there was an improvement, and the output of the iron mines in that year was 13,151,612 tons, and the average selling price was $2.79402 per ton. Much of the ore is mined subject to royalty payable to the owner of the fee, the average being $0.23136 per ton. Including the royalty, the average on iron ore was $0.52380 per ton; out of this margin the royalty charge had to be met, and in addition, taxes equal to $0.13784 per ton. That is to say, the net profit remaining to the mining companies, after allowing for certain other smaller items, was $0.14674 per ton. Thus, after deducting expenses of production from the selling price, nearly one-half of what was left went as royalty to the fee owner, and the remainder was divided almost equally between the mining company and the tax collector. Before payment of the royalty the taxes amounted to 26.31 per cent of the profits, after payment of the royalty, to 47.13 per cent. Measured by pre-war standards, this was a heavy rate of taxation.

Mr. Finlay's method has the merit of being systematic, and it takes into account the essential factors of value, but it is evident that no allowance is made for the unexpected. A demand may arise for iron ore far in excess of anything previously known, with a corresponding increase in price and consequently in profits. On the other hand, stagnation may set in, prices may fall, and iron ore may become practically unsaleable. In the former case the valuation of the mine, based as it was on normal conditions, is too low; in the latter, too high.

In Minnesota a similar method is in vogue, but a somewhat elaborate classification into productive and unproductive mines and prospects, with a varying standard of valuation in the several classes, has been worked out in the endeavor to arrive at equitable results.

The Finlay valuation of the Michigan iron mines gave them a total value of $129,000,000, which was a large increase over the total valuation under the old methods. The companies protested vigorously, and the Tax Commission reduced the valuation to about $90,000,000. At about this figure for a number of years, it remained practically stationary, the amount of ore brought in sight year by year about equalling the amount extracted.

In the case of the copper mines, the Finlay system had an entirely different result. The aggregate value reported was $69,000,000. This sum was so far below the value of the mining properties as shown by the market value of their shares, that the companies, fearful of bearish effects upon the stock market, demanded that their old assessments be restored. This

request the Tax Commission also granted, and the copper mine valuations remained at about their old figure.

Whatever may be urged in favor of the Finlay method of valuation as applied to the copper and iron mines of Michigan, and the iron mines of Minnesota, with their immense masses of ore capable of fairly accurate delimitation and ascertainment of quantities, and individually fairly uniform in quality, it is clearly inapplicable to deposits such as those of the precious metals, where the veins are small and subject to great irregularity in size and direction, and the value of their contents. The diamond drill cannot be depended upon to the same extent in disclosing the value of such deposits. There are other minerals of value notoriously pocketty and capricious in their habit; for all such the Finlay method is unsuited. Even where ore-bodies are large and of fairly uniform value, it could not in many cases be even tried, for the essential requirement in estimating tonnage, namely diamond drill borings on a sufficient scale, is lacking. Cases can be cited where mining companies, even after years of working, were uncertain or even ignorant of the size of their deposits. To take a notable instance from the Province of Ontario; the Canadian Copper Company working the Creighton nickel mine, were apprehensive that its productive limits were being reached, and consequently prepared to exploit the Frood mine, another large ore-body, but lower in nickel and copper contents. They built a town, laid out streets, equipped the new mine with machinery and hoisting plant, and began to work it. Concurrently they continued to explore the Creighton by diamond drilling, and encountered at lower depths unexpected and very large reserves of ore. It paid the Company to cease all work at the Frood, and to continue operations at the Creighton. Had a valuation been made of the Creighton mine on the Finlay plan before the reserves were disclosed, it would have fallen far short of the correct amount.

Undoubtedly one effect of the Finlay system in Michigan and Minnesota has been to discourage exploration for ore. As soon as the drill brings ore into view, it is subject to valuation and taxation, notwithstanding that it may not be actually worked for years. Every prudent mining company desires to know its position regarding reserves of ore, so that it may be justified in making adequate capital expenditures for the winning and treatment of the same, but if to establish new ore bodies is to materially increase their taxation, the result is apt to be a slowing down of the drill.

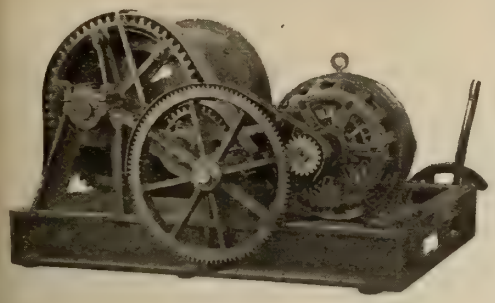
It is apparent that the Finlay and practically all other methods of mine valuation in the end rest on profits. Unless a deposit can be worked so as to yield a return greater than the cost of working, it has no real value. The controlling factor is the profit per ton or other unit of production. The sum any mine is worth depends upon the profit it is producing, and will continue to produce. When the object is revenue, not a sale, surely the more logical way is simply to tax the profits as they are realized. Since these cannot be accurately predicted, they cannot be accurately capitalized; nor is there any occasion to do so, for if they prove smaller than was expected, the tax is less and no injustice has been done; should they prove greater, the tax is larger in proportion. The net profit system automatically adjusts itself to the conditions for the time being, and takes account of all changes in expenses and returns.

Other methods than the taxation of profits have been attempted. One of these is an area tax— so much per acre, hectare, etc. This is a rough and ready method, and has no relation to value or ability to pay. An acre of barren rock pays the same tax as an acre of diamond-bearing earth, or of the richest quartz. A second method is a specified rate per unit of mineral, be it ton, pound, ounce or gallon. This has the same convenience of application as the acreage tax, but takes no account of profits or expenses. A ton of coal scraped from the last workings of a mine would pay the same rate as a ton produced from the richest and most easily worked seam; an ounce of gold wrung from ore carrying $2.00 a ton at a profit of ten cents, will pay as much as gold from $50.00 quartz; a gallon of petroleum from a well yielding a barrel a month, as much as a gallon from a gushing geyser. Such methods of taxation are easily applied, but are unscientific, and lack the essential feature of fairness.

There was an improvement in tons of ore shipped to the Trail Smelter during the week ending February 28, the total being 7,386 tons as compared with 6,921 tons during the previous week.

Cost of Coal in Vancouver.

There has been a revival in Vancouver of the agitation against the coal dealers because of what is termed the excesive cost of fuel to the consumers in view of the fact that the coal mines of Vancouver Island, the source of supply, are only some sixty odd miles distant. The discussion arose through the statement of T. Bulger, Dominion Fair Wage Officer, that the island miners obtained their domestic coal for $4.50 a ton with an extra dollar a ton for delivery. This was the same coal which was selling in Vancouver for $10.15 a ton. The dealers declare that their profit at the latter selling price is not more than from 40 to 47 cents a ton. They say that they buy their coal at $6.45 or $7.20 a ton loaded on the scow at Vancouver Island, but that added to that figure are such expenses as freight charges, insurance, unloading, screening, sacking, and delivery. These items, with the wages of all engaged in the operations at from $4 to $5 a day and a loss in screening of from 10 to 15 per cent., accounted for the difference between the purchase price at tidewater on the Island and in the cellars of the consumers. If the coal miners were getting their coal for $4.50 at the pit mouth the opinion was expressed by the dealers that they must be obtaining it at below cost. It was further explained that the reason that some dealers were able to sell at $10.15, and other were forced to charge $10.50 a ton was that the Fuel Controller had issued an order requiring the Canadian Western Fuel Company to sell at not more than $6.45 per long ton loaded on scows, while the Canadian Collieries (D), Ltd., were permitted to dispose of their coal at a higher figure, which they had fixed at $7.20 per long ton on scows. This decision had been reached after an investigation into the cost of production in the cases of the different collieries of the Island. The dealers' contention is that the prices to the consumers are based on expenses and a profit to them of not more than from 40 to 47 cents a ton.



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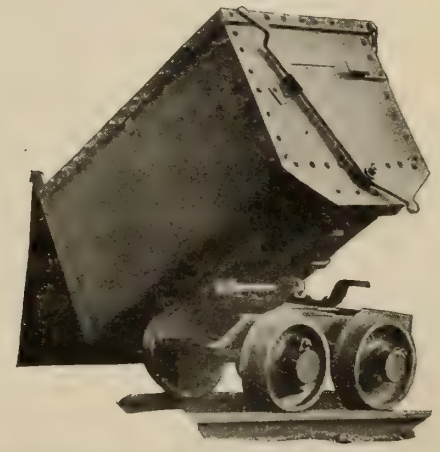

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Readjusting Wages at Anyox.

Announcement is made that the employees of the Granby Consolidated Mining & Smelting Co. at Anyox, B. C., who number approximately 1,200 men, have decided, after deliberating for six days over the company's proposal to return to the sliding scale of pay with certain other concessions, to reject such an arrangement for the continuance of the work of the smeltery. The vote showed a majority of only 19 in favor of refusing the terms offered. As a result the plant has been shut down and the men are losing at the rate of $7,500 daily in wages. There has been no trouble in the camp and it is hoped that in a few weeks, perhaps by the time the damage caused by the recent fire are repaired, an amicable settlement will have been reached.

THE GOLD MINES.

Slowly but surely the value of gold is increasing, the reason being that it is costing less to produce gold. Slowly but surely the cost of material is growing less, and, as the yardstick of commerce, an ounce of gold is worth more because it will noy buy more. Slowly but surely the efficiency of the mine workers is increasing, and as each man will now handle an increasing tonnage of ore each day; it follows that each man is producing gold at a greater rate than formerly, and the same wage for which he worked during the time when inefficiency caused curtailment at not a few gold mines.

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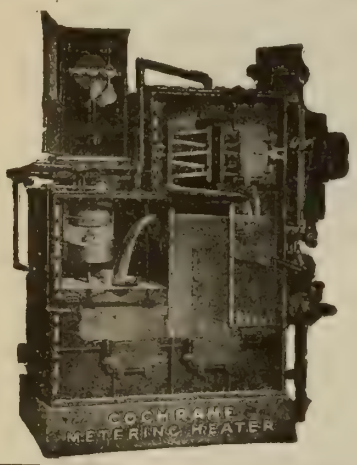

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:-: EDITORIAL :-:

OUR PLATINUM AND PALLADIUM OUTPUT.

As pointed out by the "Toronto World," the recent reports of the Mines Department, Ottawa, and the Bureau of Mines of Ontario give little information concerning our production of platinum and palladium.

In the tabular summary of mineral production of Ontario for 1918, platinum and palladium do not appear at all, in spite of the fact that Ontario is a very large producer of ores containing these metals. We understand that the reason for this omission is that producing companies are not required to make the necessary returns.

In the tabular statement on mineral production of Canada, palladium does not appear, while the production of platinum is given as 39oz. This is, if anything, worse than the Ontario report for it gives the impression that the production of platinum has been reported and that it is only a very small amount.

In his notes on the various metals, however, Mr. McLeish, who compiles the Dominion statistics on mineral production says: "The recorded production of platinum in 1918 was 39 crude ounces (25 fine ounces) valued at $2,560, as against a production in 1917 of 57 crude ounces, valued at $3,823, and was all obtained from the placer gravels of the Similkameen district, British Columbia.

"Undoubtedly the most important sources of the metals of the platinum group in Canada are the nickel-copper ores of the Sudbury district, in Ontario, which are smelted at Copper Cliff and Coniston, and refined at Port Colborne, Ont.; New Jersey, United States; and Wales, Great Britain. A definite record of the total recovery of the metals of the platinum group and of gold and silver from these ores has not been obtained. Unquestionably there is, at least, a partial recovery of these metals in connection with the refining operations."

Why is there no record of output of platinum and palladium?

AN EXPLORATION SCHEME.

The "Winnipeg Telegram" in an editorial on March 18, proposes that the Government should undertake a survey of the mineral resources of Western Canada. The scheme involves the engagement of a hundred or more mineralogical experts by the Government, each to be sent out in charge of a party of returned men previously given educational training in prospecting by a three months' course in the university. The country would be divided into sections and the work carried on systematically. It is argued that the country might in this way provide remunerative occupation and vocational training for a large number of returned soldiers.

We agree with the "Telegram" that a more systematic and detailed survey of our mineral resources is needed and that it should be undertaken as soon as possible, as every day that development is delayed means a loss to the country.

To put into effect such a proposal would, however, necessitate a great change in the Government's attitude with regard to the employment of technical men. The present policy of the Government is to discourage technical men from entering its employ. The present employees of the Mines Department receive ridiculously small salaries, considering their qualifications. So long as the present rate of pay continues we need expect few applicants for such positions. If the Government is unwilling to pay adequate salaries for competent men to take charge of such explorations as proposed, the work would be done in an unsatisfactory way.

THE ROYALTY ON ORES.

In commenting on the weak points of the present mining regulations applicable to lands administered by the Department of the Interior, The Pas Herald says: "Another point in the Dominion regulations that scores heavily against them, is the royalty upon ores produced from these lease-held claims. The amount of royalty is not stated, and is to be fixed by the minister as he thinks best. This is an outstanding bad feature of the regulations, and is in itself quite sufficient to make capital chary of coming in."

There is good ground for this criticism. The Minister may have the best of intentions and may never impose unresanoble royalty. We have no good reason to assume that he would so discourage desired development of our mineral resources. But the failure to place a limit on royalties is tantamount to reserving the right to expropriate all profits. The mere fact that such a thing is possible under the law is sufficient to keep investors out of the country.

No law that does not recognize the hazard capital takes in development of mineral properties can be satisfactory. When a company develops one property successfully there is too often a demand that the operators should not be allowed to make large profits. The public seems unwilling to admit that those who spend money in developing mineral deposits should be greatly rewarded if successful. Our contention is that the only justification for the large expenditures which are made for exploration and development is that those who are successful are well repaid for their enterprise.

If the Government reserves the right to impose heavy royalties, the odds against the prospector are increased. How can we expected anyone to risk money in developing prospects if there is no hope that any of the prospects will prove to be very profitable?

It is, of course, quite proper that those who make fortunes from the development of our mineral resources should contribute largely to the public treasury. They expect to do so. But if the venturesome are discouraged there will be little development and our mineral deposits will be idle until a wiser generation sees that laws which cause delay in development are costing the country great loss.

The parts of the country whose mineral resources are administered by the Department of the Interior are not being developed as rapidly as they should be. If the Department is anxious to see that development is speeded up, it should see that objectionable features of the regulations are altered.

THE PROPOSED MONOPOLY OF WESTERN OILFIELDS.

Some time ago the Shell Transport and Trading Company made an application to the Department of the Interior for exclusive rights to explore a quarter of a million square miles of land in Northern Alberta and part of the North West Territories. At the termination of five years after declaration of peace the company would select 25,000 square miles of this territory for its own purpose. We understand that the first proposal was turned down; but that another attempt to put over this preposterous scheme is being made. It has been intimated that the proposal is considered worthy of consideration.

We do not wonder at the Government entertaining a proposal that would seem to provide a way for more rapidly developing our resources. It is the duty of the Government to speed up development if it can. We strongly object, however, to any such scheme as this. Companies that will not conform to our regulations should not be given any special privileges. We do not believe that our mining regulations are perfect, but we do believe that all who wish to develop our mineral resources should be governed by those regulations. The regulations need some amending; but Canada should not countenance the granting of special privileges to any company.

Strangely enough it is possible for our government to grant such proposals as are asked for by the Shell Transport and Trading Company without any proper consideration of the merits of the proposal and without any publicity. By order-in-council the monopoly could be granted without anyone outside the Council having a chance to object. The Government does not even acknowledge that it owes it to the country to obtain the opinion of qualified men as to the merits of the proposal.

Under the circumstances it is impossible to learn what is going on at Ottawa. From what information has leaked out it is obvious that there is a good chance of our Government making a serious mistake in this matter. Those who are responsible will do well to consider whether they should place so low an estimate on the value of public confidence. To restore confidence there is needed a declaration of policy. We would like to see an announcement from Ottawa that the Council disapproves of such action as is contemplated in the proposal of the Shell Transport and Trading Co. Less order-in-council government in all matters relating to disposal of natural resources is to be desired. It is bad enough to have mining regulations subject to order-in-council changes, but it is far worse to ignore those regulations when it is desired to favor certain companies.

UNITED STATES WILL PAY FOR LOSSES INCURRED BY "WAR MINERALS" PRODUCERS.

Former Senator J. F. Shafroth, of Colorado, Philip M. Moore, St. Louis, Mo., and former Representative M. D. Foster, of Illinois, were appointed by Secretary of the Interior Lane as members of the commission that will have charge of the payment of the losses incurred by mining men in the production of manganese, chrome, pyrites, and tungsten for war purposes.

During the war the Interior Department, the Emergency Fleet Corporation, and the War Industries, War Trade, and Shippings Boards insistently urged the mining men to produce these materials to supply the urgent needs of the nation for war purposes. When the armistice came, these mineral producers, as a result of their response to the demands of the Government, had on hand ready for delivery quantities of these materials, for which there was no peace-time market.

Congress set aside the sum of $8,500,000 to meet claims for these losses, which must be filed within three months after the passage of the act. The law states that the claims must have been incurred between April 6, 1917, when the United States went to war, and November 12, 1918, when the armistice was signed. The Secretary of the Interior is charged in the act with taking into consideration and charging to the claimant the market value of the minerals on hand November 12, 1918, and also the salvage or usable value of the machinery that was installed to produce these war minerals.

Mr. Moore is a former president of the American Institute of Mining Engineers, and a well known engineer.

Mr. Shafroth was a member of the Senate Committee on mines and mining of the Sixty-fifth Congress and Mr. Foster was chairman of the House Committee on mines and mining.

UNITED MINE WORKERS' CONVENTION.

With further reference to the recent annual convention of District 18, U.M.W. of A., one of the important questions discussed was the renewal of agreements, one of these, that between the miners and the management of the Crow's Nest Pass Coal Company, Fernie, B. C., being due to expire on the 31st of March. It was announced, in this connection, that a policy committee meeting would be held at Indianapolis on March 18th, which would be attended by representatives of all districts. It was decided, therefore, that the operators should be approached with a view to arranging for an extension of the present contract, the high cost of living commission award being paid on the wages. This was agreed upon in order that the demands of District 18 could be made to conform, in some degree, with those of the miners of the United States and possibly those of Great Britain. Representatives appointed to represent the district at this meeting are: P. M. Christopher, district president; Robert Livett, international board member; Frank Wheatley and Alex. Susnar. International Organizer David Rees also will attend. These delegates were instructed to endorse the proposals contained in a circular by Frank Farrington, president of the Illinois miners, for a six-hour day and a five-day week.

In the conference with the operators, which took place subsequently, Fuel Director W. H. Armstrong presided and the utmost good feeling prevailed. The operators agreed to postpone negotiations pending the meeting of the policy committee, and a further meeting with the operators is to be arranged as soon as possible after the return of the District 18 representatives.

Two noteworthy changes made in the constitution of District 18 Organization by the Convention were that conventions and election of officers should be held biennially instead of annually.

Preliminary Report of an Investigation into the Concentration of Graphite from some Ontario Ores

By the Staff of the Department of Mining Engineering, University of Toronto.

The beneficiation of graphite ores is recognized as one of the difficult problems of the art of ore-dressing. Unlike many minerals, graphite has no method of concentration that might be called standard; each mill has its own method, the mills between them employing nearly every known means of concentration. In addition there are a number of carefully guarded secret processes.

The difficulty in the production of graphite arises from the nature of the graphite itself, and from its mineral associations, which difficulties are complicated by exacting market standards.

Graphite occurs in two forms; crystalline and amorphous. Either form may occur as a massive variety, or as a disseminated mineral. Most of the Ontario graphite ores are of the crystalline and disseminated type, the graphite occurring as flakes varying in size from one-half inch in diameter down to dust. In Ontario are large deposits of graphite bearing rocks, yet in 1917 only about 4,000 tons of graphite was marketed, of which approximately one-third was of the best or crucible grade. This investigation was made to elucidate the principles underlying the concentration of graphite and possibly to make commercial propositions from some of the at present valueless deposits.

It is estimated that more than one-half of the graphite consumed in the world is used for the manufacture of crucibles. As graphite suitable for crucible manufacture commands a very much higher price than other grades, this investigation is limited to the production of crucible-grade graphite.

The specific gravity of naturally occurring graphite varies from 2.1 to 2.9 according to its purity, an average being 2.6; the specific gravity of the most commonly associated minerals is from 2.6 to 3, consequently complete separation of the graphite from its mineral associates by gravity methods alone is impossible.

The cleavage of graphite is so perfect that the mineral splits readily into flat scales. In wet gravity concentration methods this flakiness causes the migration of the graphite to be extremely erratic and a process depending on the flakeyness is apt to be complicated by the presence of mica or chlorite, both flaky minerals and commonly found with graphite.

Graphite is a very easily floated mineral and almost any of the systems of flotation can be used to make a good recovery. Unfortunately, mica, pyrite and calcite, common gangue minerals, are not difficult to float and these with the unavoidable middlings, are recovered more or less with the graphite.

Other processes, as electrostatic separation and chemical methods, which are used to some extent, are undesirable on account of high cost of operation or of difficulty in manipulation.

It can readily be seen from the foregoing considerations that no simple process of milling graphite is possible, that any method of procedure must consist of crushing to liberate the flake; gathering of the flake and final recleaning of the impure flake. In this operation some regrinding is almost unavoidable, and because of the large size of flake desired, coupled with the softness of the graphite, the methods employed for crushing both the original ore and the recovered concentrates become of prime importance.

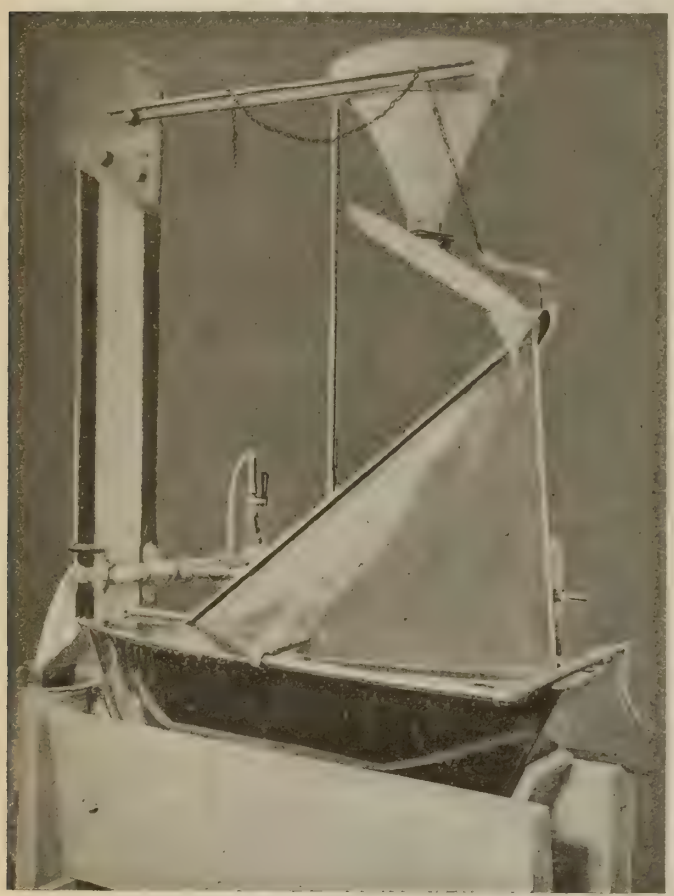
The ideal grinder for a graphite ore is one that will separate the various crystal grains with a minimum of crushing and also remove the freed graphite as rapidly as possible from the sphere of action. Such a grinder will make a granular product with a minimum of slimes. Of existing crushers, the rolls for dry crushing and the ball mill or rod mill for wet crushing deliver a product that approaches most nearly to the ideal. Wet crushing for graphite ores has some advantage over dry crushing in addition to the elimination of dust, particularly if the wet grinding is to be followed by a wet process of flotation, because graphite is soft and adhesive and in grinding tends to smear the gangue particles thereby increasing the flotable middlings. With wet grinding this tendency is negligible. With wet grinding also the flakes are washed free from dust, making possible a cleaner product. If a considerable excess of water is used in the ball mill, the flakes are washed away from the sphere of grinding action very rapidly, thereby reducing the destruction of flake to a minimum. Of course a mill run under these conditions will be inefficient considered only as a crusher, but any loss in capacity will be more than made up by the resulting increase in the saving of coarse flake.

Because of the desirability of avoiding all possible subsequent crushing, the method of concentration should aim at making a clean concentrate if possible, or one containing the smallest amount of coarse sand particles and middlings. This is of more importance even than a high extraction of the graphite from the ore, for a complete extraction is valueless if the flakes are so small as to lose their commercial value. For this reason, in choosing a method of flotation for trial in these first experiments, weight was given to the need for oil and that one was chosen which called for the least amount of flotation agent. Since all the commoner flotation processes call for oil, and as the use of oil appears to entail some gangue being floated, these methods were laid aside in favor of some form of skin flotation which may be used without frothers or oilers. Skin flotation on a dry product was considered as out of the question, the float being invariably dirty and also entailing the disadvantage of requiring the drying of a considerable tonnage of rock, whereas a wet process of flotation following the wet grinding would call for the drying of only a comparatively small quantity of graphite. Also, the disagreeable dust would be eliminated to a great degree in a continuously wet process. So the object sought was to combine a wet grinding method with a wet skin flotation process and to follow up with a wet recleaning and grading system.

The apparatus used for the experiments were laboratory machines described in the following paragraphs.

The crusher for small lots consisted of an iron pot revolving on an inclined axis. Into this pot can be placed iron balls of various sizes from 5 inches diameter down. The capacity of the mill is 2 Kilo's of ore per charge. This mill was used for grinding the ore for most of the tests and for regrinding middling and concentrate. For larger quantities a ball mill of 2 ft. 6 in. by 2 ft. inside measure was available. Another small rod mill 12 in. by 18 in. was used for some tests.

The flotation process used is a modification of the old Bradford process in which the pulp flows down an-



Concentrating Machine—Front View.

inclined plate dipping beneath a surface of water. The actual machine used is described in the Canadian Mining Journal of July 1st, 1917. Figures 10 and 11 are photos of the machine. No comparative work was done on the selection of flotation oils. The only oils used were coal oil and occasionally small proportions of rosin oil. The quantities used were so small that no greasiness was at any time noticed on the graphite. The amounts of oil varied between 2 and 16 drops per kilogram, the maximum being ¼ lb. per ton of ore.

The screens used throughout were according to Tyler's Standard Screen Scale.

The ore selected for most of the experiments was a hard granite ore found in Ontario. The bulk of the rock is a pale pink orthoclase, changing in places to microcline. Considerable biotite is present with pyroxenes, pyrite and occasionally horn blende and specks of titanite. The graphite occurs as scattered flake, ranging in size from ⅜ inch down to dust, with a few rich bands of almost solid graphite varying in thickness up to two inches.

A quantity of this ore was crushed in a gyratory crusher to pass 1 inch and further crushed to pass ⅜ inch. This was sampled and divided into lots of about 2 kilograms.

A screen analysis of one of these lots showed that the sizes coarser than 8 mesh contained practically no free flake, the 8/10 mesh a few and the 10/14 mesh and smaller sizes contained much free flake. The proportion of attached particles diminished with the decrease in the size of particles until at 65 mesh the true middlings were comparatively few.

Concentrating Machine—Side View.

Details of Some of the Tests.

For convenience of reference the tests are numbered consecutively, though only a very few of the experiments are detailed here.

Experiment No. 1.

One kilo of the ore was ground wet in two stages until all the gangue passed 10 mesh. During grinding 4 drops of coal oil were added to the pulp in the mill and the oiled pulp was then floated without extra oiling. The resulting graphite assayed 65% carbon. The tails were re-oiled with 4 more drops of oil and re-floated until the finer sands were clean, most of the remaining visible graphite being in thick pieces coarser than 14 mesh. The resulting float was very dirty, being largely made up of true middling.

Experiment No. 2.

Like No. 1 except that only one half of the amount of oil was added to the mill during grinding. The results were much the same as in the first trial.

Experiment No. 3.

The grinding was done as before, but with no oil except the traces remaining in the crusher from the

previous grindings. On flotation the first unoiled float looked clean, and assayed 79.3% as against 65.0% of the first test. These three tests showed that even small quantities of oil greatly increase the amount of gangue lifted, which, in view of the subsequent crushing, is undesirable. Therefore, all later grindings were made without any oil.

These tests had produced a quantity of material containing considerable gangue and tests were made to get an idea for a suitable treatment for such dirty concentrates.

Experiment No. 4.

The low grade oiled floats from Experiment No. 1 were reground wet without further oil until the gangue passed 65 mesh and then screened, the oversize being a clean looking flake. The undersize was refloated giving a concentrate that was not particularly clean.

Experiment No. 5.

The very dirty second float from Experiment No. 3 was re-ground and re-screened as before at 65 mesh, the oversize mixed with a quantity of tailings was refloated, resulting in a clean tailing but a dirty concentrate. This concentrate was re-ground till the gangue passed 80 mesh and then screened, giving a clean flake and a tailing from which repeated flotations failed to obtain a clean product. The assays of these combined experiments are given in table 1 and 2. These results indicated, what later trials confirmed, that re-flotation alone is not sufficient to clean a concentrate and that re-grinding followed by screening will give a clean flake.

TABLE 1.—(Combined Results of Expts. 1 & 4.)

Size mesh	material used	product obtained	weight	assay % carbon	Remarks
	ore		1000	6.9	
—10					
+65	1st float	flake	36	87.0	material from Expt. 1, ditto.
+65	2nd float	flake	20.3	84.5	
—65		flake	10.5	68.0	
		tailing	862	.76	

TABLE 2.—(Combined results of Expts. 3 & 5.)

Size mesh	material used	product obtained	weight	assay % carbon	Remarks
	ore		1000	6.9	Materials
+65	1st float	flake	39.2	79.3	from Exp. 3
+80	2nd float	flake	37.8	86.4	
—80		flake	8.0	59.3	
		tailing	852	.55	
		loss	73		

Experiment No. 6.

Experiments on other ores at other times had shown that cleaner concentrates could be obtained from skin flotation by grading the material into several sizes and treating each size separately. Quality of product being the main essential in the production of graphite, trial was made of material graded by screening into four lots and each lot treated separately, viz.: The ore was crushed without oil until the gangue passed 14 mesh, the oversize was clean flake and was reserved without further treatment. The next size 14/48 mesh was oiled with coal oil and floated. The first float was clean except for a few attached particles which were liberated by a light re-grind and re-flotation: the tailing was almost pure mica. A second flotation of the sands with more coal oil and a third with a mixture of coal oil and rosin oil gave dirty floats which were re-ground and screened at 80 mesh, giving a flake and an undersize which was added to the rest of the —80 material. The size 48/80 was treated similarly. The combined undersize through 80 mesh was floated once without oil and once with oil, though no particular attempt was made to obtain a very clean product. The result of the treatment of the whole lot is given in table 3 the products being combined for assay.

TABLE 3.—(Combined results of 4 lots of Exp. 6.)

Size mesh	material used	product obtained	weight	assay % carbon	Remarks
	ore		2000	6.9	
+14		flake	5		contained no gangue.
14|48		ore	1000		most of the flake in this size.
48|80		ore	600		
—80		ore	395		includes finest slime
+48	screened	flake	83.8	91.8	+14 flake added.
48|80	ore products as above	flake	29.0	85.6	
—80		flake	12.4	74.2	
		tailings	1874	1.4	

This gives a recovery of 112 lb. per ton of ore, of graphite flake of 90% carbon and +80 mesh size. This is a larger recovery and a higher grade of flake than was obtained in tests without grading, and is almost 74% of the total graphite of the ore recovered as a high grade crucible flake.

Experiment No. 7.

The ore of this test was low grade with the same hard siliceous gangue as the ore of the previous test. Both it and the ore of the next test were considered to be of doubtful commercial value. This experiment and experiment 8 were intended as trials in the recleaning of flake. The flotation proceedure was the same as in the previous test. The result is given in table 4:

TABLE 4.

Size mesh	material used	product obtained	weight	assay % carbon	Remarks
	ore		2000	4.4	
—14					
+80		flake	96	67.4	This assay
—80		middlings	31.5	31.9	is much
+200		tailings	1514	.4	lower than
—200		slimes	358	1.9	the appearance indicated.
+80	flake		96	67.4	
+80		flake	56	88.1	this flake
85|150		middlings	14	59.1	looked clean under the microscope.
—150		dirt	26		this was a low grade brown product largely of mica.

In experiment No. 8 the ore was like that of No. 7 except that the original graphite flakes were smaller, most of the flakes passing 28 mesh. The procedure was as before except that flotation was added as part of the recleaning process. Table 5 gives the extraction before recleaning.

TABLE 5.

Size mesh	material used	product obtained	weight	assay % carbon	Remarks
	ore		1350	4.7	
+80		flake	61	68.1	
—80		middlings	46.5	20.7	
+200		tailings	1147	.9	
—200		slime	96	2.6	not treated

The regrinding and screening through 80 mesh of this +80 mesh flake raised the assay to 80% carbon, a second regrinding brought the assay to 85%; but at the expense of heavy loss in quantity, only 35 grams remaining from the original 61. A second test was made on the ore, an effort being made to avoid the necessity of such excessive grinding. The ore was graded as before and floated, giving a +48 mesh flake and a middling. This middling was re-ground and refloated, the floats being added to the first flake, and

the concentrate was used for the recleaning test. A light regrind to crack the true middlings was followed by screening, giving a +48 mesh flake assaying 85% carbon and a 48/80 mesh flake assaying 71% carbon. An attempt was made to separate the 85% flake into two parts by flotation, one of which should be sufficiently high grade as not to require recleaning. This was not found to be possible, the difference in assay between the floats and the sinks being so small in every case as to be negligible. Regrinding the sinks and screening gave a product assaying 88.43% carbon, while similar treatment of the floats gave a product assaying 88.40% carbon. These two last when reground and screened gave a product assaying 94% carbon. This shows that regrinding is a necessary part of the recleaning and that reflotation alone is not sufficient.

Screening, particularly of fine sizes, is not a desirable process and grading can often be better performed by classification when used as a preliminary to other processes. In the case of graphite, classification would appear to have a further advantage over screening in that it might be possible to remove a large part of the purer flake from the coarser sizes of gangue to the finer sizes of gangue and thus avoid a considerable loss of flake in the grinding of the coarser portion of the gangue, which portion is the larger part of a properly ground graphite ore. In some cases it might be possible to remove a part of the gangue directly as tailing without treatment, though on the ores tried this was not possible.

Some of the advantages of classification over screening for graphite ores are shown by Experiment No. 9. A quantity of the ore as used in the first experiments was crushed in a ball mill until the gangue passed 8 mesh. This pulp was divided by a hydraulic hindered settling classifier into lots, each lot being treated by flotation, followed by regrinding and screening as the method of recleaning. The results are shown in table 6. This table shows well the increase in the amount of dirt floated with the increase in the amount of oil, also the assay of the first float is higher than anything obtained either without grading, or with screening as a means of grading. A screen analysis of some of the products shows that following grading by classification, screening alone will remove a large part of the dirt. See table 7. As shown by this experiment, H. S. classification followed by screening of some of the products is capable of giving a considerable quantity of flake that does not require regrinding; which means a saving of the larger and more valuable flake. In this particular case, by combining the first float of the 35/80 mesh lot with the clean flake obtained from screening the second and third floats of the same lot (product 8, table 6, and products 7 and 9, table 7), was obtained a flake assaying 92% carbon and in quantity approximately one-third of the total recovery expected from this ore.

TABLE 6.

gangue size mesh	material used	number	product obtained	flotation oil per Kilo	Weight	Assay % of carbon	Remarks.
	ore			none	24554	6.9	
8|35	ore	1		none	5679		C.O. = coal oil, R.O. = rosin oil.
		2	1st float	none	24	76.7	some middlings, no free dirt.
		3	2nd float	2 drops C.O.	109	86.7	much true middlings.
		4	3rd float	none extra	10.5	64.0	much true middlings.
		5	4th float	6 C.O. 4 R.O.	348.5	39.2	very dirty.
		6	tailing		5187	1.4	contained thick lumps of graphite.
35|80	ore	7		none	6614		
		8	1st float	none	228	96.2	very clean flake.
		9	2nd float	2 drops C.O.	314	68.6	much true middlings.
		10	3rd float	6 C.O. 2 R.O.	300	22.1	very dirty.
		11	tailing		5772	1.0	
80|300	ore	12		none	7119		
		13	1st float	none	713	81.5	flake fairly clean to the eye.
		14	2nd float	2 drops C.O.	212	41.4	dirty.
		15	3rd float	6 C.O. 2 R.O.	155	29.4	very dirty.
		16	tailing		6139	.8	
—300	ore	17			5142		not treated.

TABLE 7.—(Screening of products of table 6.)

material used from table 6)	number	product obtained	size mesh	Weight.	assay % carbon.	Remarks.
No. 2, 3, 4, & 5 all 8|35 floats	1					all these products contained so much middlings that screening would not give a clean flake.
	2					
	3					
	4					
No. 8 1st 35|80 float		clean				this was very clean except a few grain in
	5	flake		228	96.2	the 65|80 mesh size.
No. 9 2nd float	6			314	68.6	
	7	clean flake	—28	143	88.9	clean to the eye.
		middlings	28|35	171	51.7	dirt present mostly as true middlings.
No. 10 3rd float	8			300	22.1	
	9	cl. flake	+28	52	83.2	good flake.
	10	middlings	28|35	58	19.3	mostly true middlings.
	11	dirt	—35	190	6.2	largely composed of mica.
						The distinction between these three products was very marked.
No. 13 1st float 80|300	12			713	81.5	these were not assayed, but the difference
	13	cl. flake	+65			in appearance of these three products was
	14	middlings	65|100			also very pronounced.
	15	dirt	—100			

The ore used in the previous tests was a siliceous ore of which the feldspar and quartz gangue minerals are not easily floated, while the previous tests show that the free biotite present did not present any difficulties with the method of treatment adopted. A test (Exp. 10) similar to the last was made on an ore of a different type, an altered limestone, the carbonates of which are much more easily floated than the silicates. It was considered that it might be more difficult to obtain a high grade flake without considerable regrinding and loss of flake. The actual work showed that the loss was not as great as expected; that while the floated graphite was not quite as high grade as that from the other ore, the greater ease with which calcite particles could be crushed made possible a large recovery of a high grade flake. The details of the extraction are given in table 9 and a summary of the recovery in table 8. The original ore assayed 14.6% carbon, the recovery of crucible flake was 232 lbs. per ton of graphite assaying 90% carbon which is a recovery of 71.7% of the total carbon present in the ore. When allowance is made for the original flake of smaller size than 80 mesh and for the inevitable losses in grinding due to the breaking up of the larger flake it will be seen that this is a very good recovery. A treatment of some lumps of the original ore with acids and subsequent screening of the flake showed that approximately 3 per cent. of the original flake was less than 80 mesh in size, which makes the recovery of possible crucible flake 74 per cent.

TABLE 8.

Size mesh	material used	product obtained	weight	assay % carbon	Remarks
—14	ore		1940	14.6	mesh size of gangue only.
+80		crucible flake	224.8	90.5	total of all +80 flake.
—80		flake	111.2	20.3	no attempt at cleaning.
		tailings	1604	2.0	slimes included.

In all the tests made, only rarely was it found possible to obtain a concentrate of graphite of such high grade that no further cleaning was necessary. Also it was found that re-flotation alone is not sufficient and that a combination of screening and flotation, while applicable sometimes, was generally useless without some regrinding of the flake.

The usual procedure in the recleaning of graphite is to grind dry between buhr stones. This method is open to the objection of being very destructive of the larger flake on account of the twisting and abrading character of the grinding action. For this reason in some mills an attempt has been made to substitute fine rolls for the buhr stones. Rolls fine enough to grip flake graphite are expensive and costly in upkeep and are not well adapted for wet crushing. A rolling action is better than a twisting one because the flakes will split and roll out flat rather than break thus liberating any enclosed mica without much reduction in the size of the flakes. Wet grinding of flake in addition to the advantages accruing to a continuously wet process has possibly a further advantage in that by dry grinding methods flakes of mica may be simply smeared with graphite and thus hidden instead of being removed. The wet grinding tests showed a possible additional advantage of wet grinding over dry grinding in the preservation of the character of the surface of the flake. This will be referred to later.

The regrinding of the flake and middlings of the previous tests was done in the small pot and ball mill described before. This mill combined the rolling action of a roll and the washing action of a considerable quantity of water, the water preventing the smearing action of the graphite and also to some extent acting as a classifier in removing the lighter flake from the grinding face, the lighter flake presumably not requiring any regrinding. The absence of smearing was well shown in one experiment, of which the details are not given, in which a clean looking coarse flake assaying about 75% and sized between 10 mesh and

TABLE 9.

size mesh	material used	product obtained	weight	assay % carbon	flotation oil.	Remarks.
—10	ore		1940	14.5	none.	
+10		flake	13	89.2		Removed by screening. 100% clean to the eye.
10|28	ore		825			
		1st flake	70.0	76.7	none.	H.S. classifier product.
		2nd float	61.5	47.3	2 drops C.O.	few true middlings. 99% clean to the eye.
		3rd float	112.5	10.8	6 C.O. 2 R.O.	
		tailing	582.0	2.4		contains much fine true middling.
	Recleaning of 10|28 2nd float.					
10|28	float		6.54	47.3		reground and screened through 48 mesh. undersize added to the 28|80 lot. All sizes smaller than 48 mesh were very dirty.
+48		flake	32.5	93.5		
—48		middling	28.0			
28|80	ore		832			All—80 mesh material removed by screening.
		1st flake	122.0	70.9	none.	
		2nd float	70.0	g5.7	2 drops C.O.	
		tailing	640.	2.7		contains much fine true middling.
	Recleaning of 10|28 and 28|80 1st flake combined.					
10|28	flake		192			reground and screened through 80 mesh undersize added to final —80 flake.
+80		flake	142.8	93.9		
—80		flake	49.2			
	Recleaning of 10|28 and 28|80 mesh last floats combined.					
10|80	float		182.5		none.	reground and screened through 80 mesh. undersize added to next lot for flotation, oversize floated and sinks added to the final tailings. The sinks were mostly mica.
+80		flake	36.5	77.8		
+80		tailing				
—80		middling				
80|300	ore		390.5			
		1st float	42.0	35.9	none.	no attempt made at recleaning.
		2nd float	20.0	7.1	2 drops C.O.	
		tailing	428.5	.53		
—300	slimes		53.5	4.9		not treated.

48 mesh was reground and refloated. The resulting graphite flake assayed over 90% while the tailing was pure mica, the separation being very clean and distinct. The absence of the smearing action on the reground material means that it is possible to return such a product into the general circuit of the mill without the dirt being refloated by the graphite smears and reappearing in the concentrate.

The small pot and ball mill is suitable for only small quantities. Trial was made of a larger mill built more after the style of commercial machines. This mill is a small tube mill 12 inches diameter and 18 inches long with continuous feed and central discharge. In operation it was charged with about 50¼ inch diameter steel rods. This weight of rods is only a small part of a full charge of rods for the mill; but it was found quite sufficient as selective grinding is desired, only the heavier flakes and the coarser middlings requiring treatment. To aid the selective action a considerable excess of water was used. This mill used intermittently did the regrinding of the products of table 9. The results were considered satisfactory both as to the effectiveness of grinding and the preservation of the character of the flake.

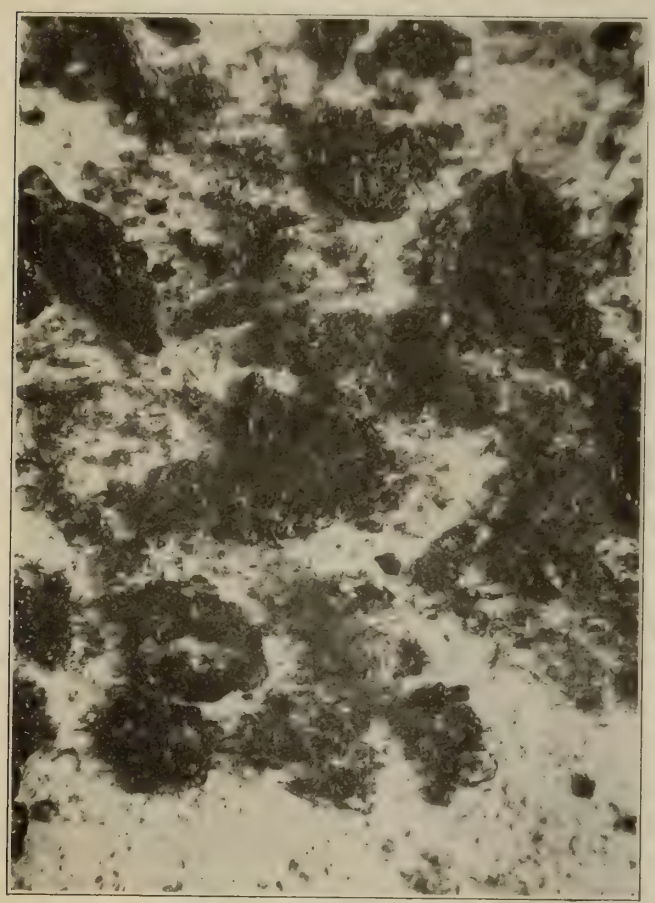


Fig. 1.—Graphite before burning Flake from product No. 2, Table 6.

A quantity of dirty graphite and middlings had accumulated from the previous work and this was made use of to get an idea as to the operation of the mill used continuously. The middlings were first run through the mill and then screened at 100 mesh, the undersize was brown and contained only a small part of the graphite and assayed between 4% and 5% carbon. The oversize was added to a lot of flake and this reground in the mill. The mill was started with water only and then the flake fed in at a rate of 50 lb. per hour. The mill was stopped one minute after the last of the graphite was in and the mill emptied. The results showed that the capacity of the mill on such a graphite material is large and the grinding efficient, even with as small a rod load as was used. In this particular instance the raising of the assay of the +80 mesh graphite from 79.5% to 95% carbon shows that the mill was operated much under capacity and the graphite consequently much over-ground, resulting in an unneeessary destruction of flake. Owing to an accident the complete returns cannot be given, but table 10 gives a summary of the results of the last regrinding.

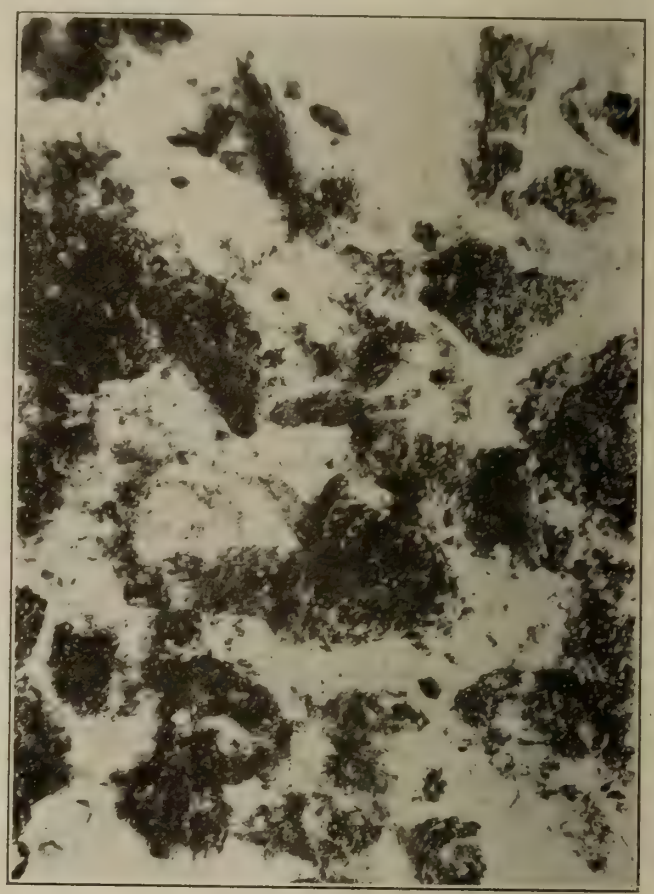


Fig. 2.—Mica remaining after the burning.

TABLE 10.

Size mesh	material used	product obtained	weight	assay % carbon	Remarks
10|100	original flake		4920	70.6	
+80		flake	3670	79.5	Screen sizing test before regrinding.
—80		flake	1250	64.3	
+80		flake	1915	95.0	Screen sizing test after regrinding.
—80		flake	3005	56.7	

Confirmatory evidence of the impossibility of avoiding regrinding, apart from the regrinding of gangue which may be visible as middlings, is given by physical examination of some of the flake. Repeatedly in making these tests graphite products were obtained that to the eye and to the feel of the fingers were clean and in some cases the microscope failed to show the presence of any dirt, and yet the assays were often disappointingly low. This invisible dirt consists of some minute particles of quartz, etc., embedded in the

Fig. 3.—A raw unground flake.

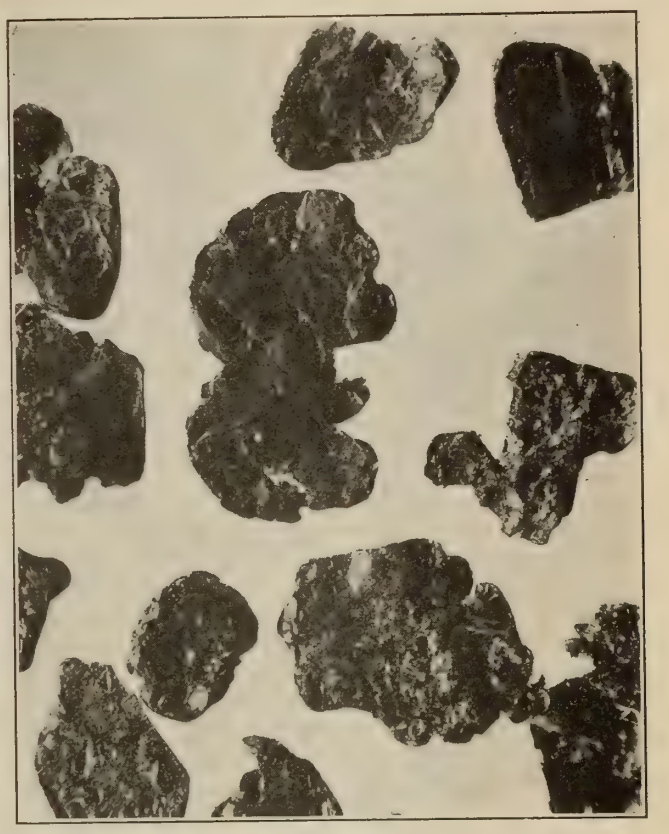


Fig. 5.—Wet ground flake. (Compare with Fig. 4.)

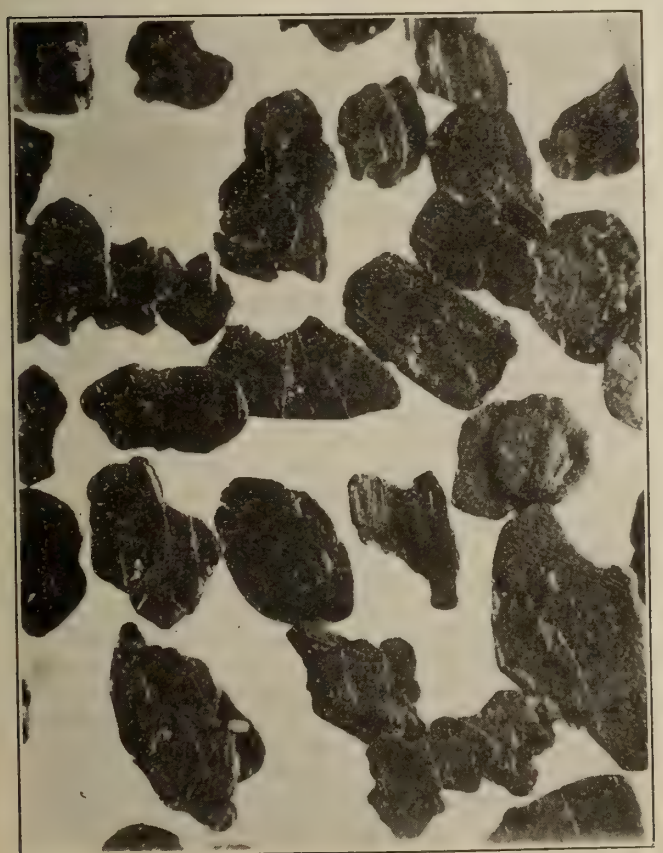


Fig. 4.—Crucible grade graphite. Dry ground. (Note rounded edges.)

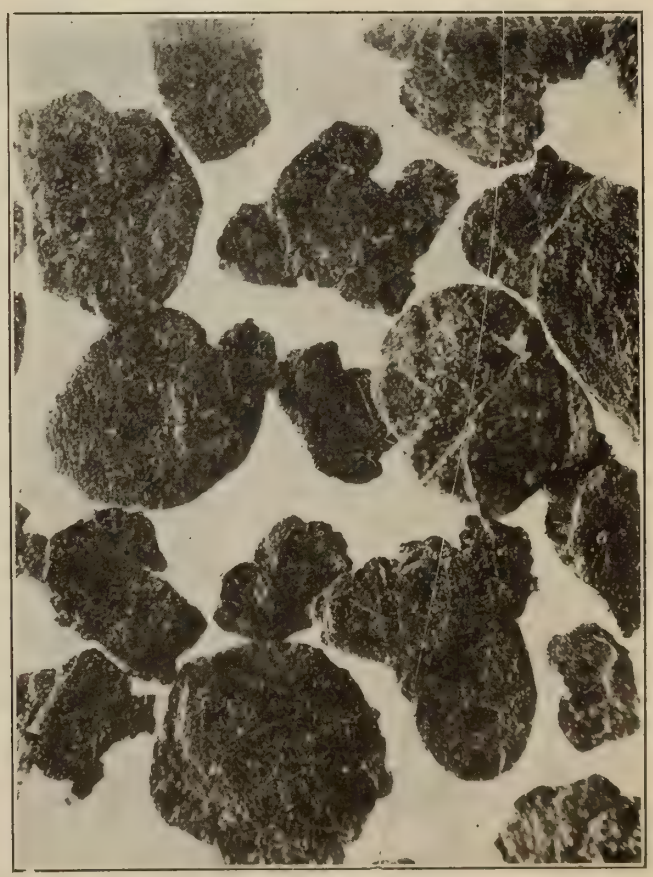


Fig. 6.—Wet ground flake that has been given a slight regrind.

flake and some iron compounds, very often as oxide, distributed throughout the flake, but by far the larger part of the dirt consists of flakes of mica sandwiched between flakes of graphite. The iron rusts are not usually in sufficient quantity to be of great importance provided the mica can be efficiently removed. The distributed dirt can only be removed by chemical means while these tests show that the mica can be comparatively easily removed by proper means of regrinding. The intimate relationship of the mica and the graphite is well shown by figures 1 and 2. Figure 1 is a flake from product No. 2, table 6. This was hand picked to be 100% pure to the eye aided by a glass. It was placed on an alundum plate and burned. Figure 2 is a photo of the remaining mica after combustion for 35 minutes in an atmosphere of oxygen. In each case the mottled background is the alundum plate on which the flake was placed for burning.

American crucible manufacturers, for the manufacture of their graphite crucibles, prefer a form of graphite imported from Ceylon rather than the flaky product of American origin. Of the graphite they use only about 20% is of domestic origin, the remainder being imported. This preference is partly due to the at one time unreliability of the domestic grades and production; but the manufacturers also state that Ceylon graphite makes a better crucible than the domestic flake of the same grade and chemical composition. This difference must then be due to the physical character of the flake, probably to the thickness of the flake and to the nature of its surface. With many graphites the thickness of the flake, and with all graphites the character of the surface, depends on the

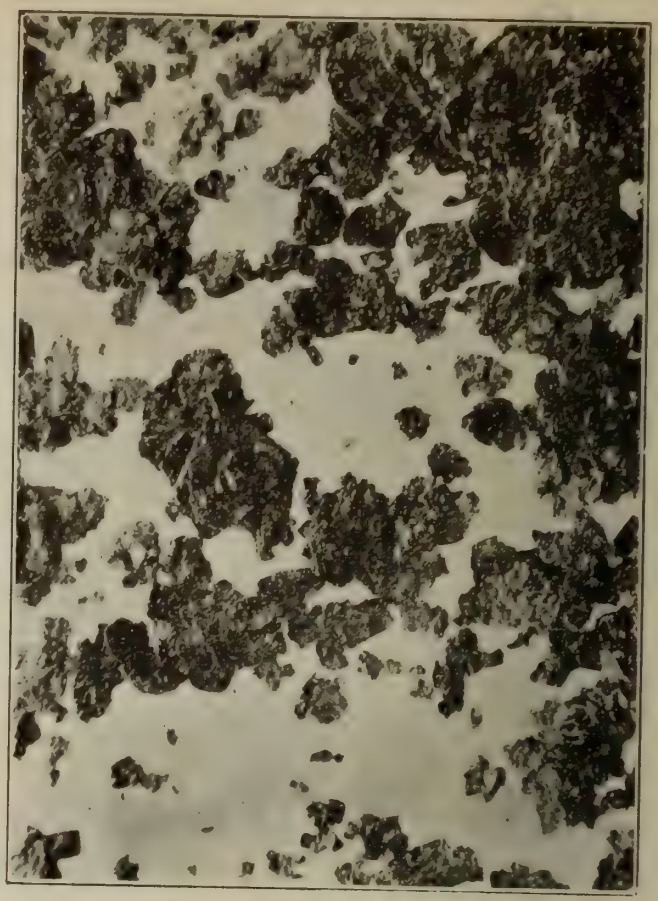


Fig. 8.—Wet ground flake of Table 10.

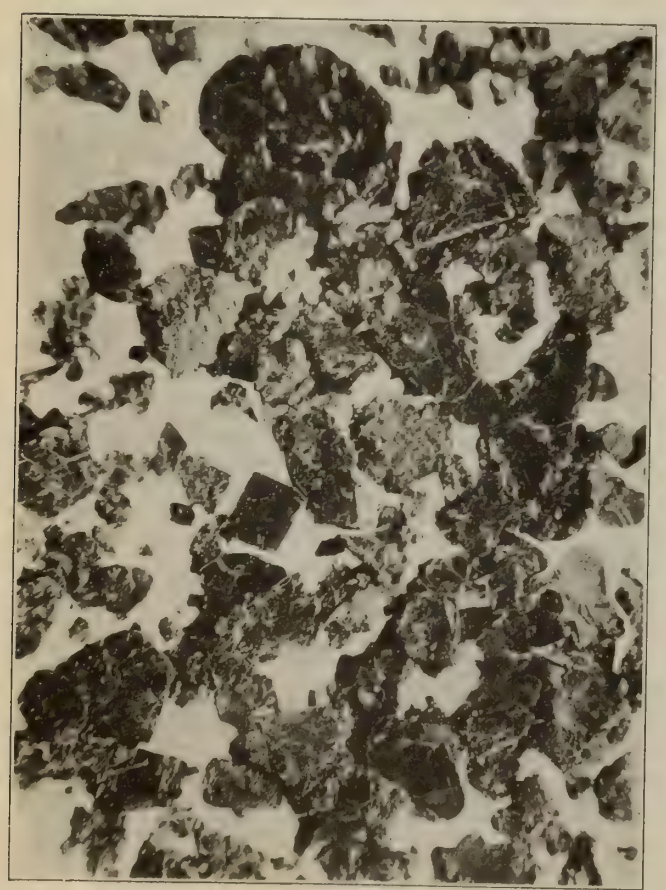


Fig. 7.—Wet ground flake of Table 1. (Square fragment of orthoclase in centre.)

nature of the regrinding process during cleaning. Naturally by reducing the regrinding to a minimum the original thickness of the flake will be best preserved; but the nature of the regrinding by preserving or destroying the natural surface structures of the flake may have a most important effect on the future use of domestic flake. Next to the refractory qualities of a crucible is its strength and toughness, and, given the right kind of clay as the bonding agent, the strength will depend on the bond between the clay and the graphite, which bond will be best if the naturally occurring roughnesses of the flake are preserved. Graphite is crystalline and the crystalline character expresses itself on the surface of the flake in a variety of cleavage lines and facets, resulting in a distinctly rough surface which is the ideal surface for bonding purposes. Figure 3 is a photo of a raw unground flake and shows the irregularities on the natural surface. Ceylon graphite, which requires little grinding before use, retains these irregularities and thus makes a good bond with the clay. By the common method of grinding graphite between buhr stones the roughnesses are largely smoothed away, resulting in an inferior bonding property and therefore an inferior crucible. Figure 4 is a photo from one of the graphites on the market, note the smoothed faces and rounded edges. Compare this with figure 5, a photo of some of the wet ground flake taken from the ball mill. Figure 6 is of a similar flake given a light regrind in a rotary laboratory grinder. Figure 7 is of the wet ground flake of table 1. Figure 8 is of some of the wet ground flake assaying 95% carbon of table 10. Even excessive regrinding in a wet rod mill does not destroy the surface structures as is shown by the graphite of table 8 (figure 9) of which 43% of the

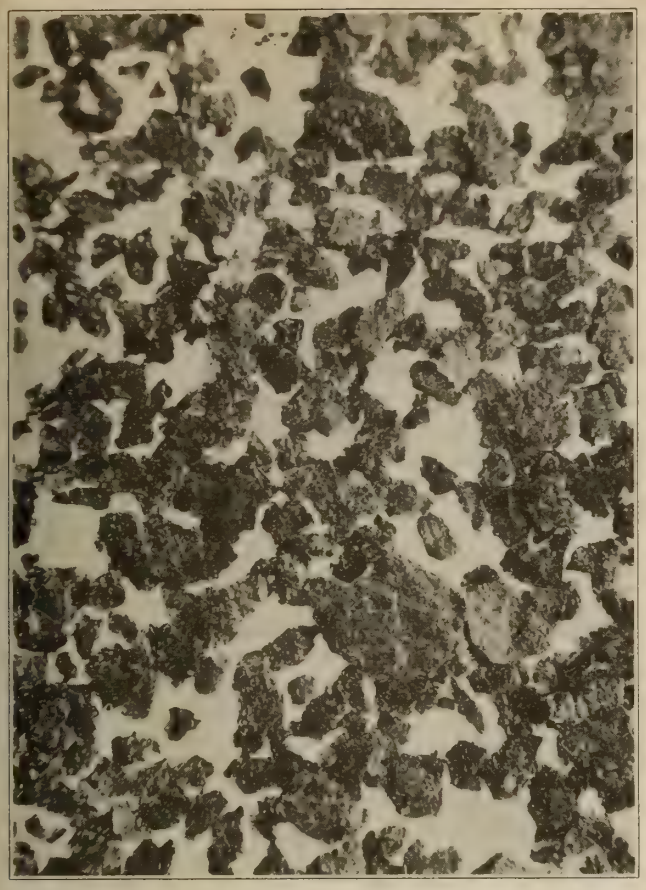


Fig. 9.—Excessively reground. Raised from 67% to 88%

flake was ground away in raising the assay from 68% to 85% carbon. Inspection of these figures shows clearly the differences in surface structure due to different grinding operations.

In these tests skin flotation was used because of its convenience and ease of manipulation, but the essentials of the system of treatment based on the results obtained will apply also to other systems employing other processes of flotation.

Proposed System.

From the results of the experiments a system of concentration for graphite ores may be outlined. The details are subject to variation and arrangement to suit the peculiarities of various ores; but in a general way the scheme is as follows:

1. Crush wet in a rod mill or a ball mill, using an excess of water and the minimum of crushing compatible with the liberation of the maximum of coarse flake.
2. Remove the large flake from the mill oversize by screening. With the smaller-flake ores this is not advisable.
3. Divide the sands by hindered-settling classification into several grades.
4. Float each grade separately and by stages, regulating the quantity of oil to the requirements of each stage, making concentrates middlings and waste.
5. Regrind the concentrates and the middlings separately in a rod mill with excess of water.
6. Screen wet, making a high grade flake and a dirty undersize to be returned for flotation.

This system offers some decided advantages over the older processes. The whole process is wet, eliminating the dust nuisance and avoiding the necessity of drying large tonnages of rock, saving the cost of heat and the handling required in the drying operation. The only drying that will remain to be done will be of the small proportion of finished graphite.

The minimum destruction of flake due to its rapid removal and the minimum of crushing required combine to produce a maximum of coarse flake from this method of crushing. The absence of smearing helps to keep the production of floatable middling at the lowest point.

Separation into grades, while not absolutely necessary, is an advantage in that it renders possible the flotation of some high-carbon flake that may not require re-grinding at all, and also because the sizing of the material helps the separation of graphite and mica in the subsequent flotation process, where the elimination of free mica is practically complete. Flotation by stages permits the adjustment of the amount of oil added, so that after the cleaner graphite is removed almost any desired amount of middlings may be obtained, leaving to be discharged as waste by far the largest portion of the ore as a coarse sand.

Perhaps the most striking difference between this system and the older systems is in the character of the final product due to the substitution of wet grinding for dry grinding, not only in the original crushing, but in the cleaning operation on the recovered graphite. Not only does the wet grinding, as proposed, split the flake, liberating the mica clean and in good condition for separation, and also doing some selective grinding as between graphite and dirt, but it does this work on the flake without destroying the original surface characteristics of the graphite flakes and so preserves its bonding qualities. The graphite flake produced by wet grinding in connection with wet screening is very different in appearance from the dry ground flake. The flake is thicker, it has a large proportion of the coarser sizes of flakes, and is more brilliant in appearance than dry ground flake because of its crystalline faces and the more efficient removal of the fine dirt by the wet screening. Graphite produced by this system should prove to be the equal or the superior of any flake at present produced.

The process as outlined is simple and does not call for an elaborate flow sheet. Any seeming complication due to flotation by stages is more apparent than real, and would be more than offset by the added recovery of only a few pounds of the high grade flake from each ton of ore.

PERSONALS.

Mr. Geo. C. Mackenzie has resigned his position in the Mines Branch, Ottawa, and will be general manager of Electric Steel and Engineering Co., Welland. He took up his new duties on March 14th. Mr. Mackenzie did splendid work for the Mines Branch.

Mr. A. F. Coyne, president and managing director of Northern Production Co., Ltd., and Mr. G. L. Stebbing, are in Toronto on their way to England.

Mr. E. J. Carlyle, brother of W. A. Carlyle, is now with the British America Nickel Corporation. He is located at Murray Mine.

Dr. E. L. Bruce, of the staff of the Geological Survey, is giving a course of lectures at the University of Manitoba during the second term.

-:- A Trip to Newfoundland -:-

By J. C. GWILLIM.

Newfoundland is, to most of us, a little known Crown colony and island, for few visit the island although we travel great distances in our own Dominion. My own acquaintance of this island does not entitle me to write a book upon it, for a week's travel began and ended it; but that week was full of interest and impressions, and technical readers may sometimes tolerate a "journey of observation," as Mr. T. A. Rickard calls it.

During the war many more or less obscure minerals were being sought for by the Imperial and Canadian Munition Boards. Many were the patriots who bombarded them with disclosures of the occurence of needed ores. In one case, Lloyd George, then Minister of Munitions, was besought to open up a molybdenite deposit, which the correspondent, a station agent in British Columbia had heard was most promising, and knew no more about it. An insistent owner of antimony bearing lands in Newfoundland importuned the authorities to examine the ground and to settle the matter some one had to make the trip. Many costly trips of this sort are made at the behest of people with more authority than wisdom.

So it came to pass that I was on my way to Moreton Harbor, Notre Dame Bay, on the east coast of Newfoundland in May, 1916. The Canadian Department of Mines could provide one with no maps, reports or other information, for it was outside its territory. A few stories of hunting trips, and a recent write up in the Journal of Commerce with a map on a small scale were all I could get before leaving. Arrived at St. John, I betook myself to the museum and geological office, but found no one there except one lady, who gave me some bulletins concerning the mineral occurrences, as scanty as used to be the Annual Reports of the Minister of Mines for Quebec. Also, to my joy, a geological map of the country made by Dr. Howley. Dr. Howley himself, after fifty years of traversing this wilderness was now unable to come to his office, so I went to see him at his home.

Here I found him, at this time, more interested in the recent publication of his life work upon the Beothuks or Red men; aborigines of the island, a race which became extinct within his own experience. I bought the book and read it later, after I had seen something of the country. The narrative is, like its setting, one which conveys a feeling of the aboriginal and prehistoric, of a distinct race which, friendly at first to the coasting fishermen, withdrew to the interior and died out like some shy and untameable animal, forever driven from the coast by relentless cruelties.

Fortified with the geological map, some local advice, and a letter of introduction to a resident of Moreton Harbor I took the Reid-Newfoundland train for Lewisport, on Notre Dame Bay. One does not go far from the coast before entering primitive Newfoundland. It is a matter of wonder that a railway should be built through such unpromising natural resources—at this time a leafless land just free of the winter snow. Coming down the Lewisport junction line through such a landscape we chased a very thin horse which had survived the winter. He tried to beat the train into Lewisport; but at a low trestle got his legs embarrassed in its timbers. We got him out and left him, not much the worse for it, regarding us from the willow brush flat which adjoins the village of Lewisport.

From this place there was a boat service to Moreton Harbor, forty miles away on an island. Thence we went to Twillingate, the "Northern Capital." As we proceeded out into Notre Dame Bay, with its many islands the wind grew chilly and there was talk of drift ice coming in.. Two of the passengers who, at first, I took to be American evangelists, turned out to be photograph enlargers. They said business was good at fifteen dollars a photo in these secluded fishing villages around the coast. They were bound for Moreton Harbor. As evening approached we sighted a few lordly icebergs, and cut through a little drift ice. The captain said he might not be able to call in at the Harbor on his return, if the ice came in. He was due to return in two days, but his boat got fast near Twillingate and I never saw it again.

Moreton Harbor is, I suppose, one of dozens of little fishing village tucked in the bottom of a good sized cove, with rocks and wilderness as a backyard. The two apparent evangelists and myself excited a temporary interest as we landed at the wharf, but the inhabitants soon drifted off to their home fires and supper. We lugged our baggage up to a Mrs. Turner's house, where strangers were sometimes taken in; but Mrs. Turner could do nothing for us. So we sat on our provisions by the wayside and held a council. The evangelists would scour the village for beds, and I would present my introduction to a local storekeeper. The storekeeper had a good sized house; but madame was at her spring cleaning, and though I protested my readiness to sleep anywhere could not allow her household goods to be seen in disarray. Thence I was taken round the bay to an ancient mariners abode. He had no room. We drifted back to Mrs. Turner's and found that after all my persuasive friends had got a lodging there, and another one for me further round the harbor. Thither I went in the darkness and found the family not yet retired.

After toasting myself at a hot stove I was escorted to an upper bedroom as cold and cheerless as an Arctic case. The Newfoundlanders are a hardy people. They seemed to be quite warm in their house clothes, at any time, whereas I had on the usual attire plus a suit of pyjamas inside and a sweater and overcoat outside.

Next morning the harbor was filling with drift ice from the Labrador coast, driven in by a cruel northeast wind. The ancient mariner of the night before was my guide over the antimony property. It was a low upland covered with bog, rock and scrubby conifers. The hand of man had not yet despoiled this ground of much antimony ore, but a well defined and once worked vein on an adjoining claim would, if produced far enough, not miss the tract under examination—for it was extensive.

The ancient mariner took great interest in the ice pack coming in. He said that last year it did not go

out of the harbor until June 21st. It was now about May 20th, and I began to look for some other way back to the mainland, for a month in Moncton Harbor seemed excessive for the opportunities offered. There was a trail or road of several miles to a narrow strait, thence to the mainland and Lewisport. While I was contemplating this, I found a good road to a more sheltered harbor in the lee of the island. Here I asked a fisherman if he could go to Lewisport next day. He thought so, but it would cost me a lot. It would cost me five dollars. "I'll give you ten," I said with much relief.

Next morning we were off in a good sized gasoline fishing boat, such as is used in "The Labrador." We dodged ice cakes and seals and arrived at Lewisport before noon. This was not much of a place to stay, though cheap enough, and I went on a local train up to Grand Falls to await the express which passed next day for Port au Basque. The station at Grand Falls is a modest affair and a shack or two near-by was all I could see. So when a man came up to me on the blind side of the train and said: "Cab, sir?" I replied in astonishment, "Where is the town." "About two miles," he said.

Between the station and the town the aspect of the country changes. One descends a little towards the river through a sprightly growth of trees. There is soil, real red earth, and some small ploughed fields. A softer, more benign landscape than elsewhere, is due to a geological factor, for there is here a basin of red sandstone, which, breaking down has left a mantle of soil rich in iron. I viewed the falls, a pretty picture in the evening sunlight, with sea-gulls flitting over them, also the great pulp and paper mills of Lord Northcliffe and the orderly little town built on a raised flat, with promise of gardens later on.

Next day the Reid-Newfoundland express took us onwards and upwards through the small scrub, bog and rock to a barren desolation which looked like the roof of the world. A weird landscape of granite boulders, with here and there a mass of glaciated rock like some leviathan watching for sunrise. Here the reinder and paleolithic man might well feel at home, or the extinct Beethuk find a refuge. It is 1,200 feet above sea. We left this drear spot by a little coulee which soon became a ravine and a valley. Toward evening we sped downwards to an arm of the sea.

On the train were some companies of the voyage from Halifax to St. John, and the Premier of Newfoundland, now Lord Morris. We whiled away the evening listening to stories of the supernatural, of which he said he now had about a hundred dealing with the wild coast and its fishermen. It is to be expected that these lonely hamlets would harbor ghosts as long as any place on the earth. I trust his life will give him leisure to make a book of curious stories. We reached Port au Basque in early foggy morning and left the treeless shore of Newfoundland for North Sydney and the green hills of Nova Scotia.

Diamond Drilling Property at Boston Creek.

Diamond drilling apparatus is being set up on the Cullen-Renaud property in Boston Creek district preparatory to the exploration of the big vein at depth. The first hole will be driven at an angle which should cut the main vein at a depth of about 400-feet. The Cullen-Renaud is a portion of the holdings of the Allied Gold Mines, Limited.

Market Conditions

In the market for mineral raw materials, a general dullness continues. Many important producing districts in the United States have curtailed operations by as much as 50 per cent. The explanation of the situation is found in the fact that large stocks were accumulated before the signing of the armistice, and have not yet been absorbed. The consumers are largely keeping out of the market until it becomes apparent that some stable level of prices has been reached, and until the extent of the post-war demand becomes evident. This situation is further aggravated by the present shortage in ships and the resulting uncertainty as to when foreign imports may be resumed on a large scale.

After investigations by the U. S. Bureau of Mines the following information was recently given out:

Iron Outlook Promising.

The outlook, although the market is still dull, is promising; the demand for iron and steel should soon begin to be felt to supply the needs of construction neglected during the war. A good example of this condition is India. Before the war India was importing almost twice as much iron and steel products as at the close of the war, and the source of a large part of the supply shifted from England to the United States. India, therefore, is short in iron and steel supplies, as compared to the normal consumption, by several hundred thousand tons.

Some demands for iron and steel products come from China and also South America during February. The activity in China is of special interest as indicating development in that country.

The chief item of interest during February was the formation of the London Iron and Steel Exchange, which is an organization to promote the interests of the British iron and steel manufacturers and producers. It is apparently the outcome of the recommenations of the departmental committee appointed by the London Board of Trade, and will be similar to the organizations in Italy, Russia, and other countries.

Copper Prices Down Before Other Prices.

Business in major electrolytic copper markets for February is reported as ranging between 18½ cents at the beginning, and 16 cents towards the end of the month. Sales from minor interests have probably been somewhat under these figures. Figures for total sales are not available at this time, but it is apparent that sales have been made at the expense of prices.

From 1904 to 1913 the average price of copper was 15 cents. At no time since 1898 has the average annual price of the metal fallen below 12 cents.

Were the prices of food stuffs, necessities of life, steel products, manufactured articles, and other inflated commodities to approach as near normal as current quotations of copper, industrial activity and expansion would probably prevail. The establishment of a Government price-adjustment board is expected to accelerate the return of industry to a normal basis.

Lead is Cheap.

The domestic market for lead has been very dull during January and February. During the week of February 13 to 19, the St. Louis price varied from 4.60 to 4.75 cents per pound, as compared with an average price in 1918 of 7.222 cents, and in January, 1919, of 5.316 cents.

It is to be noted that following the abandonment of a fixed Government price for lead the London quotation rose from 29 pounds to 40 pounds as the average for December. During January there was a recession owing to accumulating stocks, and on February 19 the price was apparently stable at 25 pounds.

Galvanizers Still Using But Little Zinc.

The domestic market for zinc has been very dull during January and February. During the week of February 13 to 19 the St. Louis price varied from 6.20 to 6.35 cents, as compared with an average price of 7.890 cents in 1918 and 6.922 cents in January, 1919.

Small consumption by galvanizers has been a feature for more than two years, and accounts for the decreased domestic production of secondary spelter. Galvanizers are buying to some extent at low points in the market.

In London, the removal of the fixed government price was followed by a rise from £54 to £56.050. Notwithstanding increasing government stocks this price held during January, but had fallen by the 19th of February to £45.

Chromite.

Little interest is exhibited in either the production or purchase of chromite. Considerable speculation is indulged in regarding the ability of either American or Canadian purchasers to compete with such foreign fields as New Caledonia and Brazil. No market quotations on chrome ore nor ferrochrome are available.

While domestic production of chrome ore is practically at a standstill, and there is no market for the ores except for those shipping on old contracts, yet the imports are of fair size and are increasing.

Pyrite.

There was no marked activity in the pyrite and sulphur industries during February, owing primarily to some curtailment in acid manufacture, and to the slowing up of other industries utilizing these materials.

The termination of hostilities found the large consumers of pyrite and sulphur with considerable reserves of raw material and finished product on hand. Until these reserves are absorbed and markets and prices are adjusted to a peace-time basis, the demand for both pyrite and sulphur is likely to remain uncertain.

Some individuals in intimate touch with the industry think that sulphur will come into active competition with pyrite. Others, however, take the view that the sulphur producers will not cut the price of sulphur to any extent in order to compete with pyrite. They believe that the sulphur producers may compete to some extent in some of the more favored localities in the South, but will not bid for the business along the North Atlantic coast.

Advice from some of the larger consumers, such as the General Chemical Co., is to the effect that they are not at present in the market for either pyrite or sulphur owing to large stocks. One of the largest consumers of pyrite and sulphur operating its own mines has sufficient stocks on hand for a considerable period, at its midwestern works, and expects that its seaboard works can be supplied, as formerly, by Spanish ores.

The Canadian pyrite industry is not active. The present shipments into the United States are from the Eustis and Weedon mines in Quebec, and the General Chemical Company's mine at Sulphide, Ontario, at the rate of approximately 6,000 tons per month, or 75,000 tons per annum.

One of the General Chemical Company's mines in western Ontario, is not shipping, and is not likely to resume operations for at least a year.

Sulphuric Acid.

Information furnished by a representative of the Chemical Alliance indicates that there has been considerable curtailment of production since the first of the year, also some falling off in price. Acid of 66°B. is now being offered at about $20 per ton in the Eastern markets, and by-product acid, 50° B, from the zinc plants, is being offered as low as $10 per ton in the Chicago markets.

The acid manufacturers kept their plants running at nearly full capacity until the first of the year, in order to keep labor employed, although in the latter part of the year the demand for acid for war purposes had practically ceased. Thus the large reserve stocks already on hand were increased. Besides, at the termination of the war, there were in transit and in storage large stocks of acid at the various explosive works.

The outlook for a large demand for acid in the steel and oil industries is exceptionally good.

Magnesite.

The magnesite industry continues in much the same condition as in January and late in 1918. Some of the consuming companies are taking advantage of the quiet condition to make necessary repairs, or changes, at their plants.

One of the most important factors in the success of Austrian magnesite has been the careful standardization of the finished product, attained only by careful selection and preparation of the raw material, and skillful burning, whereby a product of uniform quality has been assured. Uniformity and close adherence to specifications undoubtedly have been important factors in the growth of both Austrian and Grecian business in the United States.

Gypsum.

Gypsum production is largely influenced by activity in the building industries. The large decline in use in 1918 was caused both by lack of demand on account of stagnation of building industries and by restriction of shipping due to high freight rates, scarcity of bottoms, and war regulations.

Increased activity in the gypsum industry for 1919 is presaged by the incorporation of several new mining companies, the building of new mills, and the reopening of old mines. The Gypsum Industries Association, of Chicago, Ill., has launched a campaign to popularize greater use of ground gypsum on the farm both as land plaster and as a deodorizer and a fixitive of ammonia in manure about stables.

Special Correspondence

NORTHERN ONTARIO.

Prospectors Review Licenses.

Renewal of mining licenses, which are the fundamental basis on which all mining claims are staked and held in the North Country, is in full swing. The time for renewal expires on or before April 1st. Officials at the various offices throughout the North state increased activity among the prospectors is apparent this year, presaging greater activity in the prospecting game during the coming spring and summer.

Sinking Central Shaft at Miller-Independence.

The enlargement of operations announced some weeks ago for the Miller-Independence Mines, Limited, of Boston Creek is now under way, and the central shaft has been commenced. This working is being prosecuted by the use of two plugger drills, and rapid headway is expected. The shaft will be sunk to a depth of 600-feet. It is expected the main vein of the property will cut across the working before this depth is reached. A station is to be cut at the 300-foot level and a crosscut driven to the vein at this point. No time will be lost, however, in sinking. Once the station has been made at the 300-foot level, extra machines will be put on for the purpose of crosscutting.

In the meantime drifting operations will be continued on the orebody in the 200-ft. incline shaft, where calaverite was first discovered on the Independence, and the importance of the rich orebody made known. The work now in progress in this portion of the mine will permit of blocking out a large tonnage of high grade ore for early treatment in the mill, and it is anticipated stoping operations will soon be under way. Thus, by the time the central shaft has reached the proposed depth of 600-feet the mine will be on a producing basis down to the 200-foot level.

The connecting of the subsequent levels of the mine will probably be accomplished by raising on the orebody from the 600-foot level, thus facilitating the work, and gaining time in the development of the property.

A second large vein discovered has a dip which should cause it to cut the new central shaft at a depth of about 280-feet. Very little surface work has been done on this vein, but it has been proven to contain gold tellurides. The development of this vein at the point where expected in the new shaft will give added interest to the progress of the work at the Miller-Independence. The management are making plans for the installation of electric power to replace the present steam plant, and this will facilitate the development of the mine to a very great degree.

Right of Way Mines.

The annual general meeting of the shareholders of the Right of Way Mines, Limited, of Cobalt, will be held at the head office, Ottawa, on March 24th, for the purpose of receiving the annual report for the past year, the election of officers for the ensuing year, and for the consideration and if deemed advisable, ratifying and confirming by-law No. 49, passed by the directors authorizing the sale of the company's unissued shares at a discount of 97 per cent. below par and for the transaction of such other business as may properly be brought before the meeting.

Nipissing Dividends.

The dividend of 5 per cent., declared by the Nipissing Mining company, payable April 21st, to shareholders of record March 31st, will call for a disbursement of $300,000. This will make a total of 15 per cent., or $900,000 already distributed this year. The total disbursements of the company since 1906 have now reached the huge figure of $18,840,000, while the total production of silver from the big mine is in the neighborhood of 52,000,000 ounces.

Kerr Lake.

During the month of February the Kerr Lake Mining company produced an average of approximately $3,400 every twenty-four hours. Therefore, although production shows a decline during the past few months, the mines' output is still maintained at upwards of a million ounces of silver annually. The production at this property at present is on a basis similar to that of the Coniagas and O'Brien properties. The financial position of the company is exceptionally strong.

Mining Corporation.

During the year 1918 the Mining Corporation of Canada shipped 1,994,061 ounces of silver. This significant fact is no doubt responsible for the latest dividend announced by the company being unaccompanied by the usual bonus, which had become almost as regular as the dividend disbursement itself. For the year 1917 the company was the heaviest silver producer in the Cobalt camp. During 1918, however, both the Nipissing and Kerr Lake production exceeded that of the Mining Corporation.

Operating the Old Foster Mine.

The continued operation of the old Foster property at Cobalt, under lease is said to be attended with very gratifying results, some very good ore is being bagged. A considerable tonnage of Cobalt ore is being mined from the second level. The water is being pumped from the lower workings of the mine preparatory to carrying on further exploration work, while a substantial tonnage of mill rock is being developed at the first level.

Ore Shipments.

Ore shipments over the T. & N. O. railway during the month of February amounted to 1,186.93 tons of silver ore from Cobalt and 88.50 tons of nickel ore from the Alexo Mines at Porquis Junction. Silver ore shipments from the respective mines were as follows:

Mine.	Tons.
Buffalo	220.00
Coniagas	218.52
Dominion Reduction	95.25
Hudson Bay	30.77
Kerr Lake	73.90
Larose	73.66
McKinley-Darragh	239.26
O'Brien	96.00
Penn-Canadian	52.20
Trethewey	40.55
South Lorrain:	
Pittsburg-Lorrain	46.82
Total	1,186.93

Murray-Mowgridge.

Satisfactory arrangements are said to have been completed for the financing of the Murray-Mowgridge property at Wolfe Lake, near Bourkes' Siding on the T. & N. O. Ry. Supplies are being taken in to the property and active operations are expected to be under way early in April. A small mining plant has been installed on the property and the vein on the surface has been stripped for a considerable distance, while the shaft has been sung to about one hundred feet with a small amount of lateral work accompanying. The results of the limited amount of work so far done on the property have been decidedly encouraging.

Matachewan Gold Mines.

Due to friction between the principals involved in the leading mining property of the Fort Matachewan Mining Field (the Matachewan Gold Mine) the district is losing the benefits which might be derived from the active exploration and development of the property. It was expected the winter roads would be used for the transportation of supplies to this property and that active operations would be resumed early this spring, but such has not been the case. While it is generally admitted that the district has a good deal of merit, the failure of the Fort Matachewan Gold Mines to proceed with development work naturally has a restraining influence on would-be purchasers of mining properties in the district. It is nevertheless the opinion of not a few mining men that Fort Matachewan will ultimately receive due attention with excellent possibilities of developing satisfactorily.

Adanac.

Continued favorable results are being met with in the development of the Adanac Mine at the 310-ft. level. Last week ore was broken into when a winze was started which was of exceedingly high grade, the vein having a width of from ten to twelve inches. Considerable high grade ore is being bagged and the outlook is very favorable.

Will Build Railway to Kirkland Lake.

The recent announcement that the Ontario Government will build a branch line of the T. & N. O. railway into Kirkland lake from Swastika, is one of the most important announcements ever made in connection with the development of the Kirkland Lake Gold area. The decision has been reached after careful investigation of the conditions existing at the various properties in the camp, and puts a stamp of approval on the merits of the camp and presages a great future for the district. The steady grow and development of this camp has gone on in spite of the rigors of war. The past two years has been marked by very rapid development of the camp from the initial stages to that of a thriving modern mining town. With the completion of the transmission line of the Northern Ontario Light and Power Company's line from Cobalt, bringing abundance of electrical energy for the operation of the many mining plants and lighting of the mines, the need for better transportation facilities led to the construction of a truck road from the railway to the camp, coupled with telephone connection with the outside world. All this time construction was proceeding on mining and milling plants, until to-day five mills have been completed and a sixth is under way. Now, it has been officially announced the camp is to have a railway. Much speculation is rife as to which route will be chosen for the railway. Some favor the route around the south end of the lake, thus passing in close proximity to the leading mines, while others are in favor of the railway crossing Kirkland Lake at the narrows to the north. It is officially stated the latter route has a lighter grade than the former. The cost of operation at the various mines should show a substantial reduction with the completion of the railway and the abolition of the present necessary expenses of hauling supplies.

Hunton-Kirkland.

Recent developments in the Hunton-Kirkland deal are understood to have been disappointing. Difficulties appear to have arisen which, while possibly not insurmountable, have altered the trend of the company's affairs and tend to surround the deal with much uncertainty.

Work Resumed at Minaker-Kirkland.

Work has been resumed at the Minaker-Kirkland property at Kirkland Lake. The Minaker lies adjacent to the Lake Shore Mines on the south. A number of well mineralized veins have been opened up on the surface of the property and a shaft has been started on the most promising of these veins, where it passes onto the Minaker from the Lake Shore. The necessary mining equipment for the preliminary development of the property has already been installed, and thus another active operation is added to the long list of Kirkland Lake Mines. Mr. John W. Morrison, formerly manager of the Lake Shore Mines is in charge of operations at the Minaker.

Tough-Oakes Resumes.

The Tough-Oakes Gold Mines at Kirkland Lake this week resumed operations. This pioneer gold mine of the Kirkland Lake camp is now apparently free from the retarding influence of serious litigation, and appears destined to soon resume its place among the leading gold producing mines of the Dominion. Although mining operations were resumed this week, it is not expected the mill will be placed in operations for some time yet, possibly not until early in June. During the most prosperous period of its career the Tough-Oakes mine produced gold at the rate of about $60,000 per month, and ranked among the first five gold mines of the Dominion. Its operation is now under control of the new interests with Harry Oakes as President and C. A. Richardson manager. Col. H. H. Johnson, representing the Kirkland Lake Proprietary is here from England, and while official announcement is lacking it is learned that plans are going ahead aiming at the connecting of the underground workings of the Burnside with the Tough-Oakes. This fact appears to indicate the probably successful culmination of the rumored consolidation of the Tough-Oakes, Burnside and Sylvanite properties. Such an amalgamation would provide a large acreage of highly mineralized territory and should mean that the 140-ton mill should be in operation at full capacity by the middle of the coming summer.

The Flin-Flon Property, Manitoba.

The great sulphide ore deposit at Flin-Flon, around which there is considerable interest at this time, was located and staked in August, 1915. It was found by Tom Creighton and Jack Mosher, who had as associates Isadore and Leon Dion, Dan Milligan and Dan Mosher. These men were sent out to prospect by Messrs. Alec Fasken, John Hammell and Frank Curry, of Toronto.

Mr. Hammell interested American capital, and, through Messrs. Hayden & Stone (acting for the Tennessee Company and others), the property was optioned at $4,000,000. Two diamond drills were operated in 1916, for a period of four months, when Messrs. Hayden & Stone withdrew. Mr. Alec Fasken, acting for others, took over the work and continued the drilling. Some forty holes were put down, at an average of 1,600 feet. The orebody averages 125 feet in width on the surface, and 2,500 feet in length. It is carefully estimated to contain 25,000,000 tons of ore, at a value of $10 a ton. Outside of drilling surface stripping has been done, and some twenty camp buildings erected. It is estimated that $300,000 has been already spent upon development work.

The owners of the porperty are Messrs. Hammell, Fasken and Currie, who control three-quarter interest, and Messrs. Creighton, Jack Mosher, Leon Dion and Dan Mosher, who control the balance. Messrs. Isadore Dion and Dan Milligan, of the original owners, sold out to Mr. David Fasken for $25,000 apiece. Messrs. Creighton, Jack Mosher, Leon Dion and Dan Mosher received a first payment of $5,000 cash from Mr. Fasken.—The Pas Herald.

THE WESTERN COMMERCIAL COAL CO.

Recent years have seen a wonderful development in the coal industry in the province of Alberta, especially in the Drumheller district, which has become famous throughout Western Canada, and is destined to be a large factor in the coal supply of the West. The Western Commercial Co., Ltd., mine operators, among the latest, have shown considerable activity in their mine situated at Wayne, nine miles east of Drumheller, and on the Goose Lake Branch of the Canadian Northern, where extensive deposits of subbituminous coal has been located in the valley of the Rosebud for a distance of 400 feet in depth. The seam has been traced to the crest of the valley. Development work was started in June, 1916. The following year 80,000 tons was mined, and in 1918 100,000 tons was produced. The output for 1919 is expected to reach 150,000 tons. Saskatchewan has absorbed the largest portion of this, with Alberta and Manitoba next in order.

Several thousand dollars were expended in equipping with mining machinery, so that every facility is on hand for the rapid working of the mine. Being alongside of the railway quick shipment can be made to all points. The head office of the company is situated at Calgary, with branches at Moose Jaw and Saskatoon.

The Canadian Northern Railway, since it came under the control of the Government, has just completed the double track of the road from Drumheller to Saskatoon, which will facilitate the rapid movement of both coal and grain, so that it is expected henceforth no delay will be encountered in supplying Saskatchewan and Manitoba, such as occurred a yaer ago. R. Wheeler.

The Mandy Mine, Manitoba.

The lens of high-grade copper ore at the Mandy has been excavated to the 200 ft. level, thus clearing out all the lens so far as explored. It was worked from the surface from open cut methods for 60 ft. A shaft was then sunk to the 100 ft. level, near the south end of the lens, and the lens stoped from that level.

From the indications from the 100 ft. level it appears that the lens would finger out towards the south-east about 30 feet below that level. On sinking to the 200 ft. level, however, the northern boundary of the lens, which, at the 100 ft. level, was dipping towards the south, was found to go down vertically, and a much larger body of ore than had been expected was stoped from the 200 ft. level. The percentage of copper was also higher at this depth, and continued higher to the bottom of the lens which was found by under stoping at about 25 feet below the 200 ft. level. Below this the ore passes into the zinc-copper mixture, too low grade for present transportation methods.

There is probably 1,000 tons of high grade ore still available in the stopes and 1,000 tons still left in the dump at the shaft. There are 7,000 tons at the foot of Schist lake, and the camp has been moved from the mine to the new camps at Schist creek, near their dump. This ore will be transferred by wagon to Sturgeon Landing, where there is already 7,800 tons on the dump. The teams will swing from Schist creek straight to Camp 2 on Athapapuskow lake. Other teams swing from Camp 2 to the half-way on the Goose Creek. returning at night to Camp 2. Still other teams swinging from camp at Sturgeon Landing to half-way on Goose creek, return at night with the ore. Each team now carries approximately 6½ tons, and there is being delivered at Sturgeon Landing, on an average, 220 tons per day.

At this rate all the ore (15,000 tons) will be delivered at Sturgeon Landing by March 21st, almost a week before the average date of break-up of the roads. At the same time, 3,000 tons will be delivered to the big bend on the Saskatchewan river, double teams swinging from Sturgeon Landing to the half-way just north of Rocky lake, and other double teams from the camp at the big bend to the half-way and back with the ore; 200 tons have already been delivered at the big bend. The total distance of haulage from the mine to Sturgeon Landing is about 40 miles, and to the big bend from the mine about 65 miles.

Having taken out all the high grade copper ore in sight, the Mandy Mine is closing down further active mining. There remains considerable tonnage of low grade ore, but present conditions will not warrant work upon it. The diamond drills will continue exploration from the 200-ft. level.—The Pas Herald.

GREAT INTEREST IS BEING SHOWN IN NORTHERN B. C., AND THE YUKON DISTRICTS.

Many inquiries are coming in from old time prospectors regarding the condition of the ice on the Yukon and the break up of the Yukon River is eagerly looked for. There is talk of great mine development in the North this coming year, and mben who have known that country for many years prophesy great prosperity in the old stamping grounds of the prospector and this is borne out by the inquiries that are being made at the present time.

Kirkland-Porphyry.

The litigation between the minority interests of the Orr Gold Mines represented by David Elliott, of Haileybury, and the Kirkland-Porphyry Gold Mines is still unsettled, the case having been heard this week in Toronto, the decision having been reserved.

A Copper Discovery in Manitoba.

According to "The Pas Herald," one of the most important discoveries of ore is said to have been made within a half mile of the Hudson Bay Railway, at Mile 191. Samples of the ore were shown to Commissioner Wallace, and some sent to Paris. It is a copper sulphide ore, with nickle, gold, silver and galena.

John Forbes is the finder, and he staked 104 claims in all. He got these claims in the late summer, and worked quietly away sinking a shaft to 75 feet. He says the mineral body is 7,000 feet long and 72 feet wide, extending over nine claims. He says there is 40 feet of iron capping before reaching the sulphide ore.

Mr. Forbes located the ore four years ago, but was unable to stake because of the regulations reserving all land within a half-mile on both sides of the railway. This regulation was withdrawn in 1918. He remained near the ore discovery for four years, hugging his secret for the time when the restrictions upon staking would be removed. The report of his discovery has caused quite a flutter among prospectors, and considerable staking is being done between Miles 191 and 195.

Mr. Forbes optimistically says that this ore body is larger than Flin-Flon, and the ore is much richer in copper. He thinks the tonnage is greater in volume and can be handled more economically. A sample assay from the four corners and middle of the shaft, at 60 feet, gave $170 in copper.

Professor Wallace states that the nickle showings were the best he has seen. He thought, in view of the fact that the surface showed weathered iron only, there must be good possibilities underneath, since high grade copper was encountered so heavily at 60 feet.

Mr. Forbes is backed by T. R. Edwards and Ward Hollands, of Winnipeg, who have prepared a program of exploration from Mile 86 to Mile 211, to cost $50,000.

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:-: EDITORIAL :-:

THE VANCOUVER CONVENTION.

There was held in Vancouver, March 17, 18, 19, a nvention that should help to draw attention to the eat mineral resources of the West, particularly those British Columbia. The Pacific province has long en an important producer of minerals, but only a nall part of the big province has yet been developed. The Committee in charge of the arrangements spared effort to make the Convention a success. Western ining men attended in large numbers. Hundreds of aste-ners would have liked to attend, but the long urney made attendance impossible for more than a w.

Among the important subjects of discussion were: old mining in British Columbia; legislation to make ssible the reduction of local ores within the pro- nce; possibility of establishing a smelter and refin- y on the Southern Coast of British Columbia; taxa- on of mining properties; the prospector and how to courage him; better utilization of British Columbia al.

All these matters are of vital interest to the indus- y. Some of them are more particularly important Westerners, but even these demand the attention men in other parts of the Dominion. Some of the bjects are of great general interest.

The men whose efforts made the Convention pos- ble deserve much credit. We have no doubt that good sults will follow, that further discussion and action ill lead to the solution of some of the many problems hich confront those who endeavor to utilize our re- ources to better advantage.

A full account of the Vancouver Convention will be ublished in our next number.

MINING TAXATION.

The mining industry must bear its share of the cost government. It is incumbent on those engaged in e industry to see that it be not burdened with more an its share and to see also that the burden be justly istributed among them. Discussion on mining taxa- on is therefore properly undertaken by members of ie Canadian Mining Institute. All members are di- ctly interested in the Federal taxes. Also, since the rovinces need money, the various branches are in- rested in Provincial taxation.

At the recent meeting of the Canadian Mining In- itute an excellent paper on the general principles of ining taxation was presented by Mr. T. W. Gibson. le recognizes that taxation must be fundamentally ased on profits, no matter what is called the basis. le holds that the destination of profits or the pur- o es for which they are used, being wholly in the ntrol of the company, should not affect the right f the state to its share. We imagine that all will gree with him in this. The value of a mine is de- rmined by the profits it will make. Taxation in any rm is therefore properly determined by the profits ven if, as is sometimes done, it is based on valuation of he property.

But though all recognize that the proper basis for taxation is profits; there are many opinions as to how the principle should be applied. Determining the profits during the life of a mine is not a simple matter, in fact, perfectly accurate determination is impossible. We can only make approximate estimates. It is the making of such estimates that leads to much difficulty and many differences of opinion. It is the proper business of those in the industry to see that such estimates are as nearly accurate as the known facts make it possible. It is also the proper business of those in the industry to see that others who have a voice in determining taxes should not be allowed to reach inaccurate conclusions owing to lack of knowledge of the determinable facts. Attempts to tax capital invested in the industry under the pretext of taxing profits should be fought to the last ditch. Some, if not all, such attempts may be attributed to failure of the tax gatherers to appreciate the facts. It is a recognized failing of tax gatherers that they will take any money that they can legally get their hands on. We have to see to it that the laws are so framed that they get only a just amount and from the proper sources from the profits and from the profits only.

While it is evident that a perfectly accurate estimate of profits cannot be made during the life of a mine, it must be admitted that the state canot wait until the profits are accurately determined. Taxation of mines is therefore likely to be applied unfairly. We can only hope to devise methods that will result in a close approximation to proper distribution.

Since the profits cannot be accurately determined in advance, a close approximation to correctness demands short term assessments. The basing of taxation on annual profits is therefore more nearly accurate than any system which, like that of estimated value of the property, implies ability to determine profits for several years ahead.

REDUCTION OF CANADIAN IRON ORES.

One of the matters which has recently received much attention in British Columbia is that of devising ways and means for the utilization of the known iron ore deposits. The establishment of a local iron and steel industry is much to be desired. Last summer the Provincial Government commissioned Dr. Alfred Stanfield of Montreal to make an investigation into the situation and his report on the commercial feasibility of the electric smelting of iron ores in British Columbia has recently been published. Dr. Stansfield reported that there is a sufficient quantity of iron ore conveniently located, water-power available for development of electrical energy, and waste wood from saw-mills for production of charcoal. He considers that iron ore, power and charcoal could be produced sufficiently cheaply for the commercial smelting of iron ores in electric furnaces; but that the power available now is too costly and development of water- power at this time inadvisable owing to high costs. He reports that it appears advisable; to develop more

of the best iron ore deposits and to make complete tests of the ore; to reserve a suitable water power for future development; to establish a plant for the economic production of charcoal from mill waste; and to investigate the new process for the production of pig iron, and if this is found satisfactory to begin immediately to produce pig iron, purchasing power for this purpose until the water power can be developed.

It is to the last of these proposals that we would direct attention, for the utilization of such a process has been under investigation in Ontario for some time. Some account of the new method is given in this number of the journal by Mr. Jas. W. Moffatt, who has had long experience in the making of iron and steel in electric furnaces and by Mr. Stansfield in his report. It was apparently to such a process as that devised by Mr. Moffatt, that Dr. Stansfield refers in his report, though he is not very clear on this point. At least the processess are similar in that the main idea is the separating of the two stages of the smelting process and carrying them out in separate furnaces.

In Ontario and Quebec as well as in British Columbia there are many iron ore deposits which will become valuable if the new process proves successful. It is to be hoped that it will be well tried out.

The iron industry of Canada is not one of which we are very proud. It is true that we turn out good iron and steel and that we contributed a large quantity of much needed munitions during the war, but the utilization of Canadian iron ores lags far behind the capacity of our furnaces. We are almost entirely dependent on imported ores for our iron. Our great plants in Nova Scotia draw their ore from Newfoundland. The rest of Canada depends largely for its iron ore on the Lake Superior States.

Ontario, Quebec and British Columbia have in the matter of utilization of domestic iron ores a problem in common. They might well unite in testing out the new process. In the several provinces and for each deposit there will be variations of the problem; but there is much in such an investigation that would be for the common good.

THE "BLUE SKY" BILL IS DEAD.

The Arroney-General of Ontario has acknowledged that his "blue sky" bill needs much consideration and revision before it is enacted. In its present form, the bill, so far as mining companies are concerned, is dead. It is to be hoped, however, that some of the ideas for the protection of investors may be put into practice. A new draft, with the objectionable features eliminated, should be prepared at an early date, so that there will be plenty of time for consideration before another bill is presented next year. We assume that Mr. Lucas will not be so discouraged by criticism that he will fail to make another effort. The bill has brought out much information that should help him in drafting a bill that would meet with the approval of those engaged in mining.

It cannot be too often pointed out to the public and our governments that the development of rich mineral resources is only possible so long as there are rich prizes for those who are successful. If by over heavy taxation the successful companies are deprived of their reward, there will be fewer deposits developed. If, by legislation, development is limited only to properties that are certain to prove profitable, there will be no deposits developed.

There is no certainty that any deposit discovered will be worked profitably. Some prospects are more promising than others and the chances may then be considered very good, but among undeveloped properties there are few, if any "sure things." Those who spend money in development take big risks. It is proper that the risk should be taken by those who are able to stand the probable loss, for the number of failures is far greater than the number of successes. The selling of shares to the general public is therefore to be commended, for the losses are thus more widely distributed and more easily borne. If there were certainty of success there would be no necessity for public subscriptions.

It is also proper, however, that those who are granted permission to sell mining company shares to the public should be required to file an honest statement of the affairs of the company and real descriptions of the property. It is also desirable that such information should be very readily available, so that shareholders may learn as much about their property as is reasonably possible. The public should be encouraged to take the risks involved in developing mineral deposits; but they should be well informed as to the nature of the risks.

It is natural that some persons will take improper advantage of the privilege to sell shares. There should therefore be provided severe penalties for offenders and suitable machinery for prosecution. It was probably with this object in view that Mr. Lucas drafted his bill. Unfortunately, some of the provisions of the bill are so drawn that, owing to the nature of the industry, the effect would be to prevent desirable flotations in order to make sure that there were no undesirable ones.

It would be very regrettable if the bill as drafted had been enacted. Assurance has, however, been given that the bill, if enacted, will not apply to mining companies this year at least. We hope that it will never be revived in its present form.

British Iron and Steel Manufactures May Now be Exported Without License.

Advices have been received by Mr. G. T. Milne, Montreal, and Mr. F. W. Field, Toronto, British Trade Commissioners in Canada, that the following additions have been made to the list of goods which may be exported without license:

Fancy goods made of Morocco and light leathers; iron and steel manufactures generally except high speed steel and certain special articles; machinery of all kinds except textile machinery and machinery wholly made of brass or copper; toys and dolls; games of all kinds.

PERSONALS.

Mr. J. B. Tyrrell has been elected a member of council of the Institution of Mining and Metallurgy, London.

Mr. Robt. Bryce has returned to Toronto after examining a property in Nova Scotia.

Mr. G. C. Bateman has returned to Cobalt.

A meeting of the Toronto branch of the Canadian Mining Institute was held on Saturday, March 29th.

A New Method for the Smelting of Iron Ores

A Process Designed for the Treatment of Canadian Ores.

By JAS. W. MOFFATT.

A new method for the production of metals from their natural oxide ores, or from their roasted sulphide ores, lies in the duplexing of two known furnaces. The ore is first treated in a "reducing" furnace of comparatively low temperature in which the ore is deprived of its oxygen as completely as possible and is then known as "sponge." This product is transferred, either hot or cold, into an electric furnace to be melted down and finished into any desired metal. More particularly, it is for the manufacture of iron and steel and their alloys, and naturally the finishing of the metal in the melting furnace makes the process a discontinuous one,—one more convenient in operation and more suitable for meeting trade demands.

Iron Sponge.

Iron sponge has been defined by Raymond as "metal in a porous form obtained by reduction *without fusion.*" Approximately its weight is about one-third that of cast iron.

In past efforts, the reduction of the oxide ores has been attempted with the use of a gas, but without substantial commercial success, as it is very difficult to get practically complete reduction without lengthening out the operation too long, and when the ore has been finely crushed, the reduction is very imperfect.

The earliest workers in iron must have been familiar with iron sponge in their crude forges, as they used the sponge, with further application of heat, for making the balls they hammered and squeezed into a malleable metal. Many subsequent efforts have been made to use it, but certain difficulties have been found to seriously interfere, and it is rarely heard of except in the trade.

These difficulties were largely encountered in the securing of complete reduction of the ore, in the lack of careful and accurate control of the heat and partial fusion or melting than occurring in consequence, and there was always present the difficulty of handling a material so readily oxidizable, for it will reoxidize both in cooling down and in being heated up again to bring it into a liquid state if an oxidizing atmosphere is present.

Temperature control is now easy and accurate with pyrometers, guidance in the control of gas analysis can be had with the use of CO_2 recorders, and a sure and certain atmosphere of reducing gas, in which to melt the sponge without reoxidation, is securable in the electric furnace.

In the manufacture of iron sponge, excellent information can be had in a study of H. H. Campbell's "Graphic Representation of the Weight of Substances in the Blast Furnace," as it also shows the temperature at which the various chemical reactions take place. Hematite (Fe_3O_4) begins to be reduced at a temperature of about 300° C., and has been converted wholly into magnetite (Fe_3O_4) at a temperature of 450° C. This ore, with the natural magnetite in the charge, begins to be reduced to ferrous oxide (FeO) at a temperature of about 500° C., and the reaction is complete at about 590° C. Ferrous oxide begins to be converted into iron (Fe) at 700° C., and the reaction becomes more rapid when 700° C. is reached, and is complete when a temperature of 800° C. is reached, all the iron being in a spongy metallic state. The sponge iron is all melted when temperatures of 1100° to 1300° C. are reached, there being some variation in the heat required according to the analysis of the iron.

It may be noted that at 800° C., the limestone of the charge is converted into lime, and in a furnace operated for the reduction of ore the stone is advantageously mixed with it, as it will act as a catalyzer and speed up the reaction. It would be inadvisable to add stone with iron sponge in the charge of the electric furnace, since carbon dioxide will begin to oxidize spongy iron at a temperature of 300° C. as pointed out by H. H. Campbell in what he calls the "landmarks" in the smelting of iron ores. The foregoing data is based on the average work of a 75 foot blast furnace, but clearly the size of the ore and the time occupied by it in passing through any particular zone of temperature must be taken into consideration of the occurrence of each reaction. The writer has made a few ounces of iron sponge at different times in experimental work when the entire operation did not take five minutes.

Previous Efforts to Utilize Iron Sponge.

Efforts have been made to utilize iron sponge in various types of furnaces, some of which may be quoted.

Harvey devised a process in which coarsely ground ore, mixed with charcoal, was placed on inclined shelves within a puddling furnace in a position that allowed it to be heated by gas entering the furnace, and, when deoxidation was thought to be complete, the reduced ore was raked off the shelves, further heat was employed to fuse it, and under it the sponge was worked into the puddled balls.

In Clays process, the reduction was effected in retorts made of fireclay, the ore having been mixed with carbonaceous material, the heat being applied externally, and the sponge iron product was then further heated and balled. It is said that his process proved slow and costly, and the iron was not always satisfactory.

Newton also used a closed container in a somewhat similar way, heating it externally to a white heat for about 48 hours, and taking the product while hot to a puddling furnace or when cold to a crucible furnace. Such a prolonged operation was naturally an expensive one.

Roger mixed ore with coal, and effected reduction in a rotating cylinder, heated externally. This he located above his puddling furnace into which the resulting sponge was dropped, further heated, and then balled.

The Carbon Iron Co., deoxidized iron ore in a reverbatory furnace provided with a carbonaceous hearth. The ore was mixed with retarded coke,—which oxidizes very slowly,—and the reduction of the ore was slow in consequence, but the sponge had the advantage

of resisting oxidation in further handling better than in the other processes mentioned.

Some attempts have been made to use iron sponge in the crucible furnace, of which a few may be noted.

Belford put a mixture of iron ore and carbonaceous material into a suitable container, heated it externally, and transferred the sponge while hot to crucible, and then melted it down, but in later practice transferred it through a closed runner to a decarburizing chamber, heated externally, where it was acted upon by decarburizing gases or steam. Evidently he found his sponge too high in carbon for making steel by the crucible process.

Lucas used a furnace similar to that employed in the cementation process, reducing in a covered container, and melting the sponge in crucibles.

The utilization of iron sponge has also been tried out in the open hearth furnace.

The Carbon Iron Co., coated the sponge made with lime to retarol its oxidation in the transfer and during the melt down in the open hearth furnace,—the coating would naturally be put on while the sponge was still on the hearth of the reverbatory.

Tourangin made sponge and protected it from oxidation by covering it quickly with ashes as soon as it was withdrawn from his furnace, or he dropped it into containers with water-cooled walls, covered it with air-tight cover and allowed it to cool down.

Trosca dropped his sponge into an air-tight buggy.

There are many other processes in which the use of iron sponges was attempted in the puddling, crucible and open hearth furnaces, but all of them could only be considered as furnishing part of the metal used in the finished iron or steel, and all would certainly in their time introduce more or less iron oxides into the bath of molten metal and in consequence increase the work of finishing the metal, for carbon dioxide in the gas used will oxidize iron sponge at as low a temperature as 300° C. in the melting down period.

Of the older types of furnace, there remains the blast furnace, and at first glance it would seem as if an agglomerated iron sponge would be able to take the place of briquettes and furnish a means of disposing of comminuted ores; but unfortunately the gas at the top of the furnace is too oxidizing as there is usually 10% to 17% of carbon dioxide present and only 20% to 27% of carbon monoxide. The sponge while being heated in the upper regions would be re-oxidized, and all the work previously done on the ore would be wasted, and have to be done over again on the material reaching the reducing zones of the furnace.

The New Process.

How the sponge is made is immaterial to the writer's process (Canada patent No. 186994, granted Oct. 15th, 1918; United States patent No. 1,294,514, allowed Oct. 26th, 1918, and issued Feb. 18th, 1919) of duplexing a reducing or metallizing furnace with an electric melting furnace.

Any scrap melting electric furnace, that can be made practically air-tight, melts the iron sponge as readily as it melts the scrap,—no special design of electric furnace is necessary for the process.

The design of a reducing furnace must suit the materials used for supplying the heat and the means of reduction, for what may be the most convenient and economical in one locality may not be so in another.

As noted already, reduction is an easy operation to carry out successfully with the assistance of modern scientific apparatus, and when the crude methods of the past are replaced by well designed furnaces for making iron sponge solely.

Such furnaces should be mechanically charged, rabbled and discharged, and means should be provided for making small additions of carbon to the charge when necessary. Preferably, the gases of combustion supplying the heat should not be passed over or through the ore being reduced. As the porosity of the ores is variable, and all ores may not be crushed to the same degree of fineness. The time occupied in the work will vary, and the furnace should be designed to take care of that. It should also be supplied with at least one, and preferably two, stationary pyrometers, indicating by colored flash lamps any variation, up or down, from the proper temperature.

An intelligent laborer could operate a number of such furnaces and the labor cost per ton of ore would be very low.

Perfect reduction at the lowest cost is the one consideration however, and how it is actually arrived at is quite secondary.

Any scrap melting electric furnace, that can be made practically air-tight, melts the iron sponge as readily as it melts the scrap,—no special design of electric furnace is necessary for the process.

Canadian Ores Available.

Ores of high metallic iron content, say 63% and over, in the crude state, are becoming increasingly difficult to get in Canada and the United States within reasonable transportation distance of any market. One of the largest concerns in the United States catalogues the product of thirty odd mines without showing one such ore; seven however range between 60% and 62%. Outside of the Helen and Magpie mines of the Algoma Steel Corporation, the Atikokan mine of the Atikokan Iron Co., and the Moose Mountain Mine of the Moose Mountain, Ltd. The orebodies in the older and more populous parts of Canada are not large, and are of low grade as a rule.

In Ontario, except the ones mentioned, no really large property has been thoroughly proved to contain one million tons of marketable ore, though there are a few of undoubted promise, such as the Canada Iron Mines properties in Hastings County and the Belmont mine in Peterborough. There are, however, many small bodies of ore in Ontario, situated conveniently to the market.

In the 48 years between 1869 and 1916, the Dominion Government reports show a total production of about 4,350,000 tons of iron ore in Ontario, an average of 90,625 tons annually, or a little less than 250 tons daily, an amount insufficient to alone supply one very small blast furnace.

In the Province of Quebec, from 1886 to 1916, a period of 30 years, there was a total production of 379,953 tons, making the yearly average 12,655 tons, or a daily average of 35 tons.

New Brunswick in 68 years,—1848 to 1916, produced 272,850 tons, a yearly average of 4,013 tons, or a daily average of 11 tons.

Nova Scotia in 30 years,—1886 to 1916,—produced 1,279,637 tons, a yearly average of 42,655 tons, or a daily average of 117 tons.

British Columbia in 30 years,—1886 to 1916,—produced 65,078 tons, and exported practically all of it to the neighboring State of Washington. This tonnage is a yearly average of 2,170 tons, or a daily average of 6 tons.

The other Provinces have done little or nothing in mining iron ore. Dominion Government reports also supply other statistics of the total output of all Canada. For a period of 30 years,—1886 to 1916,—the total production was 5,759,540 tons (2,000 lbs.) a yearly product of 191,985 tons, or a daily average of about 526 short tons, or 470 long tons, the latter being the ton used in the pig iron market. This 470 long tons of ore would have to carry about 55% metallic iron to meet the supply required for only one small blast furnace making 250 tons of pig iron daily, which is one-half the size of what is considered a good furnace to-day, when they are being built to produce up to 600 and 700 tons of pig per day.

In 1916, the United States produced about 75,500,000 tons of ore. The population being about 100,000,000; this is equivalent to 75.5 tons per 100 of population. The same year, Canada produced from her mines 340,000 tons, or 4.25 tons per 100 of population, or about one-seventeenth of what the United States did!

This is a pitiable showing when it is remembered that our geologists claim that the great producing iron ranges found in the States of Minnesota, Michigan and New York are also found in Canada, and that the last twenty years, in the thirty year period of production mentioned, include what is proudly called "Canada's growing time." There are undoubtedly many reasons why such a state of affairs exists. Some can be removed by legislation,—but the great cause of the trouble is that few of our iron mines with convenient shipping facilities can produce even 100 tons per day, and the great majority of all Canadian ores unfortunately require crushing, grinding and concentration with subsequent briquetting to render them acceptable to blast furnace operators. This cost of briquetting finally proves to be the last straw, and then nothing is done.

The Canadian blast furnace operator is able to deal with one American selling agent for his entire requirements in ore for a year's run, feeling absolutely sure of its delivery to him and of its being according to the analysis guaranteed him when making his selection. It might be added that, when that ore enters Canada, there is the enormous duty of eight (8) cents per ton to be paid on it,—and no war tax! However, if he imports his ore from Great Britain, he does not have to pay so high a duty, he can get it into Canada for six (6) cents per ton, and without a war tax as before!

New Process Will Make Canadian Ore Marketable.

It is natural to ask how can such an unfortunate condition be overcome. The best solution seems to lie in the utilization of the scores of small iron mines that are to be found between the Lake of the Woods on the west all the way down the north shore of the Great Lakes water system to the Straits of Belle Isle on the east. As there are very many large water powers available for the generation of electricity at points sufficiently convenient for the transmission of the power to suitable smelting locations, the past difficulties can be largely overcome by a reversion to the use of the iron sponge of the ancients, melting it in the very modern electric furnace, with its ideal conditions for that work, and, without removal, finishing the metal into any desired iron or steel.

Market for Product of Duplexing Process.

And what about a market for the product? It is not at all likely that the electric furnace can market ordinary pig iron in opposition to that made in the blast furnace, except under most unusual conditions, such as a very long haul from blast furnace to that market where an electric furnace is operated. Low-phosphorus—high-silicon pig iron, however, could be made for sale to the open hearth steel furnaces, and some washed metal (metal with the phosphorus, sulphur and silicon practically eliminated) and other special irons would have some market.

The natural product of the electric furnace is steel, and to that metal its work is advantageously confined from a financial point of view. It is particularly well suited to furnish the molten metal in a steel foundry, but this class of work is only prosperous in the centres of large population, and most of our smaller iron mines are situated at some distance from the cities.

During the war there was a ready market found in casting ingots for the forging of shells. The war taught us new possibilities. If existing forging and rolling plants are not disposed to continue that practice, the electric furnace plants could cast ingots, scrop them, (remelting the cropped ends with the iron sponge of the next heats), and ship the ingots to a district forging works or rolling mill which they themselves had combined to build and operate. A plate mill would find a ready market for its entire output in Ontario for instance. Rolling billets, too, would probably be satisfactory. Electric furnace steel, owing to its superior quality, will always find a sale in competition with other steels, and at a higher price even when steel of high quality is wanted.

Magnetic Concentration of the Ore.

Under the new process, the ore should be crushed fine enough to effect the best magnetic separation of the iron oxide from its associated gangue, usually silica. It is rather expensive to get rid of rock material by means of slags made with electric heat in a furnace, and an ore should be concentrated up until it carries as high a metallic iron content as possible,—over 63% say, though no hard and fast rule can be laid down, as it all depends on the analysis of each ore.

Reduction.

For reduction purposes, the carbonaceous material should be ground to the same size of grain as the ore and be very thoroughly mixed with it. Its analysis should show the weight of fixed carbon, volatile matter, moisture and ash. Theoretically the metallic iron should have one-quarter of its weight of fixed carbon present for complete reduction, but in practice a further small percentage is added. For example: 1,000 lb. of 65° iron ore (Fe_2O_3) has 650 lbs. of metallic iron, and theoretically requires 162½ lb. of fixed carbon for complete reduction, which would be found in 271 lb. of charcoal showing 60% fixed carbon in analysis.

Limestone, also finely ground like the concentrates, may be mixed in the charge, and will be calcined in the process, or it may be added as lime in the electric furnace. There should be enough lime present to make a very basic slag in the melt down in the electric furnace.

In the iron sponge making operation, there will be a considerable elimination of the sulphur in the ore, and to some extent a lowering also of the phosphorus in some ores.

Handling the Iron Sponge.

The iron sponge may be handled hot or cold. When transferred hot, the reducing furnace should be provided with means for discharging its contents into containers having air-tight valves, taking every care that air is not allowed access to it while the discharge is being made. The containers must be discharged into

the electric furnace, with like care, and preferably through the roof, the furnace having previously rendered air-tight. The current can then be put on, and it will be noticed that the charge will carry the current steadily at once without the very objectionable surging found in melting cold scrap. Indeed if the sponge is only reasonably warm, this will occur, and the running will be smooth.

The reducing furnace may be provided with a large air-tight cooling chamber underneath into the top of which the iron sponge may be dropped when reduction is complete. When this chamber is constructed to hold the product of several runs, it becomes a storage bin as well, with the lowest charge cooled below the oxidizing temperature. But, still being warm, it could be transferred without care and be charged into the electric furnace through its regular doors.

In the case of a low grade hematite, or a mixed hematite and magnetite ore, which ores do not answer well to magnetic concentration, a partial reduction to Fe_3O_4 will render it well suited for it as a rule.

Fuel.

The heat required for the chemical reactions can be either secured by burning coal or coke on a grate, or by using these in powdered form blown in with air to a combustion chamber or by using liquid fuel such as fuel oil. The burning gases from any of these fuels should heat externally the container in which the work of reduction is being carried, but preferrably should not be allowed to enter it. If electric heat is used it can be applied in the same chamber as that in which reduction is going on.

The operation of the electric furnace is practically the same as in melting and refining scrap, and no description is needed of it to-day.

Comparison With the All Electric Heat Method.

With the Swedish electric furnace (Electro Metals Co.), it requires about 1.1 K.W. hours of power to produce 1 lb. of metal, and the metals is a white iron only. This is equivalent to 2,200 K.W. hours for a net ton. It is transferred while liquid to an electric furnace, where about 300 K.W. hours of additional energy are reqired to finish the metal into steel, making the total energy used about 2500 K.W. hours from ore to steel.

Properly reduced iron sponge melts as readily as cold scrap, which can be melted and finished in good practice with 700 or 750 K.W. hours per ton. As the rock material remaining in the iron concentrates will frequently necessitate a larger amount of lime to secure a very basic slag. The weight of the slag used in the iron sponge process will be some larger than that in the scrap melting process.—probably a fair average will be 800 K.W. hours with the sponge using process. or about one-third the amount required by the all electric process used in Sweden.

In this new process no high temperature heat is lost in waste gases leaving the electric furnaces, as there will be practically no gas generated there, and, compared with the all electric heat processes, using 1700 K.W. hours of energy more than that required in the process using iron sponge, where the heat for reduction is got from lump coal, powdered coal, fuel oil or any of the ordinary available fuels, the economy in the production of steel by this method is readily seen.

Quantity of Ore Required One 6 Ton Furnace Heat.

A 6 ton electric furnace (1500 K.W. or 2000 H.P.) will require the iron sponge made from about 10 tons of 63% Fe. concentrates per heat. Four heats can be easily be made in 24 hours, but a skilled furnace operator could get five if the plant is conveniently arranged. Taking the number of heats at four, a six ton furnace would then readily produce 24 tons of liquid steel in 24 hours, and would require 60 tons of 63% of Fe. concentrates for it. If the ore mined would need concentration of 1½ into 1 to produce 63% Fe. concentrates, one 6 ton furnace would use 90 tons per day of such crude ore.

Iron Sponge Will Cost Less Than Scrap.

Owing to the existing instability of the prices of materials, and to the labor unrest it appears to be quite inadvisable to make any attempt to quote an average cost for either plant or product,—a cost quoted to-day will probably be useless a few months later. Iron sponge, however, will cost less than scrap, as soon as the war scrap is all used up.

Patent Claims.

The following are the main claims granted in the patents,—they are identical in Canada and the United States:—

1. A discontinuous process of treating metallic oxides ores which consists in reducing a charge of ore without fusion in a suitable furnace, and after reducing, excluding oxidizing gases from contact with the charge while its temperature is above the lower limit at which re-oxidation can take place, placing the reduced charge in a separate electric furnace and fusing it there in an inert or reducing atmosphere.

2. A discontinuous process of treating metallic oxide ores which consists in reducing a charge of granular ore without fusion in a suitable furnace and at as low a temperature as possible to maintain the granular form of the reduced ore, and after reducing, excluding oxidizing gases from contact with the charge while its temperature is above the lower limit at which re-oxidation can take place, placing the reduced charge in a separate electric furnace and fusing it therein in an inert or reducing atmosphere.

3. A discontinuous process of treating metallic oxide ores which consists in reducing a charge of ore without a flux without fusion in a suitable furnace, and after reducing, excluding oxidizing gases from contact with the charge while its temperature is above the lower limit at which reoxidation can take place, placing the reduced charge in a separate electric furnace and fusing it therein with a flux in an inert or reducing atmosphere.

4, 5, and 6. Cover the cooling of the charge after reduction and before fusion to a temperature below that at which reoxidation can take place, as already set out in 1, 2 and 3.

FLORENCE SILVER.

Another monthly dividend has been declared by the Florence Silver Mining Co., amounting to 1½ cents a share. A body of ore has been opened up from Stope No. 7 from No. 2 tunnel level. At a point 30 feet up it shows two feet of clean shipping ore running nearly 70 per cent. lead and 22 ounces silver, with five feet of milling ore. This is in virgin territory, west of the big original orebody which was stoped to surface and showed maximum width of 40 feet. Vertical depth from surface is about 350 feet, so that the orebody can be followed up to surface on the dip about 500 feet. The downward continuation of the same body has already been developed by No. 5, or lowest level, 360 feet down on dip of vein. Intermediate level No. 3 and 4 have not yet been extended far enough westerly to catch it. No doubt is felt, however, that the shoot will be opened up on all four levels.

EXAMINATION AND SUPERVISION OF COAL MINES.

"It is time that British Columbia ceased being the happy hunting ground of aliens. We propose, therefore, that there shall be a more rigid examination and supervision of all who are permitted to enter our mines."

These sentiments were emphatically asserted by Hon. Wm. Sloan, Minister of Mines, when moving the second reading of a Bill to amend the Coal Mines Regulation Act. Taking the measure by section he first referred to that which provides for the appointment of a Minimum Wage Board. This principle, he said, was not new to British Columbia, having been laid down by the Provincial Legislature at its last session and having wrought, he thought, generally satisfactory results. Coal mining was a dangerous industry and for that reason it was particularly apt that the principle should be applied to it. It was to be understood, however, that the Minimum Wage proposal did not extend to all the underground workers, but only to the actual miners who held certificates of competency. Of these there were in British Columbia 1685, of whom 156 were Orientals. The argument that it was discriminatory to permit the establishment of a minimum wage district in one section while another, perhaps adjacent, was excepted was answered by the statement that such action might be warranted by entirely diverse sets of conditions in different districts, in fact such differences might exist between mines in the same locality. In this respect the Act followed closely the British Act, there being 23 Minimum Wage Districts in Great Britain. In British Columbia it was intended to define not more than 3 or 4. As to the cost which also had been advanced against the contemplated amendment Mr. Sloan stated that it was the intention that the Chief Inspector of Mines should be the board's chairman and, as the other two members would be appointed from the particular districts affected, there was no force to such a contention. The cost would, he said, be infinitesmal in comparison with the results to be achieved.

As to the changes in the system of examination and the personnel of the examining board, Mr. Sloan declared the present arrangement to be cumbersome as well as loose in its supervision of candidates. For examination of mine officials a board would be appointed consisting of the Chief Inspector of Mines and two other competent and experienced men, one to represent the operators and the other the men. Miners' certificates of competency would be issued by a board consisting of the mine inspectors of the district in which examinations were being held and two others representing the Companies and the employees respectively.

It was here that Mr. Sloan declared that it was the intention of seeing that there should be a closer supervision of those authorized to go underground. Too long had this Province been the happy hunting ground of the alien. No longer when this amendment became law would unqualified men, or men of alien birth and indifferent qualification, find it possible to engage in coal mining in British Columbia.

Explanation then was given of clauses proposing the clearer definition of the duties of a Fireboss, the fixing of a definite standard in respect of gas contents of coal mines for the withdrawal of men. By mutual agreement between the Mines Department and the Crow's Nest Pass Ry. Company, when the Coal Creek Mines were found in any place to contain 2½ per cent. or more of methane the men were withdrawn. Now it was intended that this rule should be general throughout the Province. It was a safety measure solely and was in line with the provisions of the British Act. There also were amendments which it was thought would make it obligatory on the part of practically all collieries to introduce safety lamps and which would require that cables used in the hoisting of men should be lubricated at regular intervals and should not be kept in use for a greater period than two years.

Reference was made to a change which would give the Minister of Mines power to make new rules from time to time by order-in-council. This authority, it was stated, had been given by the former British Columbia Coal Mines Regulation Act. It also was contained in the Placer and the Metalliferous Act. In Great Britain the Secretary of State had power, not only to make rules, but to amend the Act. This Mr. Sloan said he was not asking for, but he thought that the Minister of Mines should have authority to make such rules as were considered necessary for the promotion of safety in coal mining operations.

Mining Taxes in British Columbia.

In the course of his budget address before the Legislature of British Columbia Hon. John Hart, Minister of Finance, made some informative statements regarding income from taxation of the mining industry and mining property of British Columbia. He stated that the mineral tax was expected in the forthcoming year to bring in $150,000, an increase of $65,000 over the previous year's estimate. Taxation on Crown Granted Mineral Claims, he said, was expected to yield $60,000, which is $20,000 more than in the preceding twelve-month. "By bringing the coal mining companies under the alternative of income tax or mineral tax," said Mr. Hart, "which is the method of taxation applied to other mining companies, we can hope for a revenue of $200,000 instead of the $160,000." Discussing arrears of taxes the Minister of Finance pointed out that some $800,000 still remained to be paid at the end of the year on account of income tax. This, he stated, was made up largely of amount expected to be derived from mining corporations and "following an audit which has just been completed will probably be paid into the Treasury before the end of the month (March)." In reference to events of the past year affecting his department Mr. Hart mentioned the holding of a sale for arrears of taxes owing to unworked Crown granted mineral claims. He said: The total arrears represented by the property which the owners allowed to go to sale were $56,192. The receipts from the sale were $6,790, of which $140 was surplus over tax arrears and costs, and unsold parcels represented arrears and costs to the amount of $49,542. The refinements of the Taxation Act which were affected at the last session of the Legislature for the purpose of enabling us to deal with the mining and other industries in a manner which would be fair to these industries as well as to the Province have been worked out in practice by the Taxation Department and are giving satisfactory results."

Mr. F. M. Sylvester, managing director of the Granby Consolidated Mining & Smelting Company, has left on a business trip to New York. It is understood that no announcement will be made concerning resumption of work at Anyox smelter until his return.

UTILIZATION OF IRON ORES OF BRITISH COLUMBIA.

As another step in the direction of encouraging the development of the Magnetite Iron Deposits of British Columbia and the establishment of an Iron and Steel Industry, those preceding having been the offer of a bounty on pig iron produced in the Province and the obtaining of a report from Dr. Alfred Stansfield, Professor of Metallurgy, McGill University, on the commercial feasibility of treating the iron ores of the Province by means of electro-smelting, Hon. Wm. Sloan, Minister of Mines, proposes asking the British Columbia Legislature, now in session, for authority to take from any of the iron ore properties of the Province a quantity of ore, not to exceed 10,000 tons in the aggregate, for experimental uses. There are at present two small furnaces situated near Vancouver, B. C., and owned by two distinct and enterprising companies which are prepared to take advantage of the terms of this legislation.

Although it is felt that, in cases where iron properties are being held with no effort to develop them, the Government should have unconditional power to take whatever action may be deemed expedient to facilitate opening them up, thus assisting the industry which it is hoped will grow to the importance, which the country's resources warrant, it is not the intention to take the ore without recompensing the owners. The latter, it will be provided, shall be allowed 25 cents per ton free of taxation on the ore taken.

One of the companies in question is the Tudhope Electro Metals, Ltd., whose office and factory is situated at False Creek. This company have been treating scrap iron. Following interviews between Hon. Mr. Sloan and representatives of this concern, the latter reached the conclusion that, in order that a complete and satisfactory demonstration might be made as to the practicability of smelting British Columbia iron ores on a commercial basis, it might be necessary to operate a plant for an experimental period of six months, more especially if various deposits were to be drawn upon for these experiments. As an inducement to undertake this they asked of the Provincial Government 5,000 tons of ore at the rate of approximately 1000 monthly. Mr. Sloan holds the opinion that there is available an ample supply of ore of the character necessary for the production of the class of pig iron demanded by the British Columbia and foreign trade. There is no doubt in his mind that there is plenty of ore, and has been confirmed by investigations carried out since he took office as Minister of Mines. It is likely, however, that the ore to be secured most readily is that to be found on claims, either undeveloped, or very little opened up, situated on or close to tidewater. This, therefore, explains his action in asking for legislative power to secure the quantity of ore in question.

With further reference to the Tudhope Electro Metals, Ltd. It is explained that its directors, as soon as assured of a supply for their experiments, are prepared to proceed and make necessary changes in their electric furnace for the treatment of magnetite ores. They, then, would be in a position, providing the results were satisfactory, to continue production, possibly upon a much larger scale, as additional electric units can readily be added to the plant to increase capacity or to carry the operations through to finished steel. The present equipment consists of an electric furnace of 1500 K.W., with a capacity of 25 tons daily and was completed recently at a cost of $50,000. It is considered to be sufficient for the work proposed and it is thought that the demonstration outlined should result in the definite determination of the feasibility of utilizing British Columbia iron ore upon a competitive commercial basis.

The Vancouver Magnetite Iron and Steel Smelting Co., Ltd., is another company interested in the securing of iron ores for experimental purposes. It has a plant situated at Ronaldsay, Howe Sound, twenty-seven miles from the City of Vancouver. This is a blast furnace having an estimated daily productive capacity of 25 tons of pig iron. The company has been engaged in the production of pig iron from scrap iron, etc. The management of the company is anxious to try the smelting of the magnetite iron ores of British Columbia, and, with a supply for demonstration assured, is prepared to make such changes as are necessary to the plant. On this point Mr. C. Campbell-Johnston, Mining and Metallurgical Engineer, says:—

"Slightly different features to those in some other places face the iron industry of British Columbia on the coast; namely, the class of iron ores obtainable locally are magnetites; hematites do not occur along the Coast Ranges of Mountains, to flux these magnetites as is practical in other plants elsewhere. This necessity of smelting by themselves magnetite iron ores, together with fluxes of limestone and coke, calls for a much higher heat in these furnaces, namely, about 3,000 degrees Fahrenheit, to exceed well the melting point of these iron ores used. Such a degree of heat is not obtained in the ordinary blast furnace practice, but can certainly be regularly acquired by the addition, as already installed at this furnace at Ronaldsay, of ample auxiliary heat from several oil burners, to be used in conjunction with the coke, where the oil is previously warmed to 80 degrees F., and atomized under 100 lbs. pressure at least, blown into the furnace by air blast, to provide the necessary oxygen for combustion of oil, to generate a high heat, but finally leaving no free carbon atmosphere—an absolute chemical requirement to reduce the iron to metal, and combined with oxygen in the ore, to carry this same gas away."

From this it will be seen that both these companies are confident, or at least very optimistic, in regard to the practicability of treating the iron ores of British Columbia and producing merchantable pig at a cost that will permit the meeting of local and perhaps outside market requirements. They claim they have the plants necessary for satisfactory experiment, and it is Mr. Sloan's intention to do what can be done to assist them in making the attempt. If they are successful he thinks it not too extravagant to hope that, from their small beginnings, will spring industries which will exploit the iron ore resources of the Province on a larger scale and eventually lead to the establishment in the Canadian Northwest of the network of allied industries which follow the production of iron and steel on a large scale. And Mr. Sloan makes it clear that any other companies prepared to undertake such experiments in British Columbia also will be accorded every possible considerations.

In support of the efforts he is making to assist and encourage those who are disposed to enter into the utilization and the development of the Iron Ore Deposits of the Province, Mr. Sloan points to the history of the industry in Nova Scotia. From a little forge shop with a capital of $4,000 and ten employees it has developed into a great industry and one of the most notable industrial enterprises of the American Con-

tinent. In view of this experience he thought that he was justified before the members of the Legislature, and would be backed up by the country generally, in extending all assistance possible to companies which were prepared, no matter on how small a scale at the start, to demonstrate the practicability of producing high grades of pig iron from the raw material now lying undeveloped in large quantities in British Columbia.

PRESIDENT HANNA PROMISES RAILWAY TO FLIN-FLON IF SMELTER BUILT.

The Pas, Man.—Manager John Black of the Flin-Flon syndicate, and John Hammell of the original owners, with Professor R. C. Wallace and J. A. Campbell, M.P., of The Pas, formed a part of the big Western delegation that waited upon the government with reference to railway development in New Manitoba.

President Hanna, of the National railways, received the delegates at Toronto, and, after hearing their representations, he pledged to do the following railway construction:—

Flin-flon Railway—If the owners of the big ore deposit there will guarantee to erect a smelter, with a capacity of at least two thousand tons a day, the railway will be built from The Pas forthwith. The syndicate owning this ore have the matter in hand, and it is expected they will agree to the erection of the smelter. It rests upon them whether the mineral fields of New Manitoba will be opened up this year.

Melfort-The Pas Railway—President Hanna assured the delegates that this line would be partly constructed this year. Work would commence from Melfort, and up the Carrot river valley for a distance of 30 or 40 miles. Grading only would be done this year, the rails laid down next year.

The Vonda spur to Melfort will have 20 miles of steel laid this year. With the Carrot river line, this will give direct connection with the Hudson Bay railway and The Pas.

The Melfort-Saskatoon-Humboldt road from Breux to Humboldt will be completed this year. The Estevan and Souris delegates were told that a line was contemplated from west of Moose Mountain to the Hudson Bay railway.

The deputation also asked that Sturgis, on the Thunder Hill line, be connected up with the Hudson Bay railway. Assurance was given that half of this work would be done this year.

All told, six lines of railway projecting towards The Pas, to connect with the Hudson Bay railway, were favorably dealt with. Two more lines, one the Flin-Flon road, are near realization than thought possible a week ago. The C. P. R. is reported to have surveyors out, running a line west of The Pas, through the Carrot river valley towards Athapapuskow like region. These two bring the total up to eight railway lines pointing New Manitoba way.—The Pas Herald.

The drift on the tenth level of the Silversmith Mine has not run out of the ore shoot yet, according to well authenticated reports. Another carload of high-grade ore is ready for shipment to the smelter. This will be the thirteenth car moved since the resumption of operations and will bring the net smelter receipts to $75,000 or $80,000 on the 90 per cent, preliminary settlement basis. The value of the shipments has ranged from $4,000 to $7,000 on this basis. The crude ore contains about 40 per cent: lead and 90 ounces of silver to the ton.

OPPOSED TO "SALE OF SHARES ACT, 1919."

Prospectors, mining men and business men in all parts of the north have become thoroughly aroused over the "Sale of Shares Act, 1919," fearing it will be a misfortune for the Province if actually put in force. Resentment appears to be unanimous. A mass meeting is to be held in the Town Hall, Cobalt, on Monday night in an effort to arrive at some plan whereby the passing of the bill can be prevented.

Leading opinion points out the fact that the present criminal law, if enforced, would prevent misrepresentation, which after all is the food on which the wild-cat subsists. If an attempt to secure money under false pretenses is made, it is but necessary to apply the criminal law. This method would not work a hardship on legitimate enterprise.

It is contended that any individual who desires to raise money for the exploration of even the rawest prospect is entitled to do so, provided always that the property being explored is not misrepresented. The pioneer always assumes the risk of loss. At the same time he also stands the chance of enormous returns on his speculation. The stock company is an excellent medium whereby the speculating public can place funds with the chance of big returns. In this way a large number of small speculators constitute a big factor in providing funds to explore and develop mining territory. In this way the small speculator is given a chance to win a share of the success, instead of the big financial interests which are able to operate without forming stock companies.

Prospecting in Manitoba.

Active claim staking is going on throughout The Pas mineral belt. About thirty were recorded during the month just closed. Mr. John Forbes, T. R. Edwards and G. B. Hall were active between Mile 191 and Mile 195 along the H. B. Ry., and they accounted for the majority of claims registered. They acted for the North Canada Exploration Co., Ltd. Dr. Robertson's party were active around Big Island. J. B. Moors got several claims at Cranberry lake. F. G. Moore and Joseph Moran staked three on the south shore of Clearwater lake. Thomas Riddoch got one at Mile 195. Bob Hassett and Deakin Hall recorded several located on the east arm of Athapapkuskow. As far as The Herald is able to ascertain, there will be three large exploration parties in the field this summer. They are the Longyear, Paull and Chica.—The Pas Herald.

Dome Mines.

General Manager C. D. Keading has returned to the Dome Mines at Porcupine, and former mill superintendent Dowset is expected within the next week or so. The work of installing the large underground crusher at the 800 foot level of the property is being proceeded with, and it is expected about a month will be required to complete its installation. This will consistitute one of the concluding steps in the big scheme which aims to place the mine on a producing basis larger than ever before in its history, greatly facilitating the handling of the ore and reducing the costs of operation. All this tends to strengthen reports to the effect that operation of the Dominion Mines at full blast is only a matter of a few weeks.

Work of National Production Committee U.S. Fuel Administration

By JAMES B. NEALE.*

(A paper presented at New York Meeting, American Institute of Mining Engineers, February, 1919.)

From the beginning of its activities, the members of the national Production Committee have felt that the following points were essential to the success of its work: The operators must feel that their operations were not 100 per cent efficient; that they should be courteous and fair in their treatment of their employees; and that they should set an example of hard work and patriotic interest in increased production.

Every move made must appeal to the sense of fairness of all parties concerned.

The men must feel that in working more faithfully, and consequently producing more coal, they are rendering a distinct service to their Government in the time of its great need. As the workers feel that greater efficiency on their part results only in greater profits to the operators, the advantage to the operator should be lost sight of, as far as possible, and the advantage to the Government in fighting the war emphasized.

Both operators and workers should know that the Government considered increased production an obligation, and opportunity for service, resting on both parties and not on the operators or the workers alone, and that both parties could very much better the efficiency of the pre-war period. Had the committee intimated that it thought the coal shortage was due entirely to the idleness and inefficiency of the workers, its campaign would have failed, for the men would have resented the charge because only too frequently their efforts to produce more coal were thwarted by bad management; besides the operators would have lacked stimulus to better effort. On the other hand, had the impression been given that the committee thought that the coal shortage was due entirely to bad management, the operators would have resented the charge because only too frequently their efforts to produce more coal were thwarted by the idleness and inefficiency of the workers; and the workers, having been thus indirectly pronounced 100 per cent efficient and patriotic, would have lacked stimulus to better effort.

Method Adopted for Increasing Production.

With these points in mind, the committee devised the following plan: A production manager was chosen for each of the twenty-eight large producing districts. For the most part these managers were nominated by the operators in each district and they became the centres of the production activities. At a large percentage of the mines, production committees were formed, one at each mine. These committees consisted of six men—of whom three were appointed by the management and three were chosen by the workers—and worked under the direction of the production manager, who served as the umpire in case of division in the committee. The members of these committees were given certificates of appointment and badges and every effort was made to have them feel that their position was one of dignity and responsibility; that they represented the Government and were fortunate in having an opportunity to render special service to the Government during the war. Their duties were carefully defined in a letter which was broadly circulated. In the main these duties consisted in discussing ways to better the efficiency of the mine and its equipment, and of the mine workers.

The members of the National Production Committee, in Washington, made every effort to protect mine labor from undue inroads by the selective draft, voluntary enlistment, munition plants, and other war activities. They looked carefully after the needs of the operators as to mine supplies and obtained proper priorities for such materials. They dealt with the railroads in reference to car supply and rendered valuable assistance to power plants selling electricity to the mines. Soldiers who had seen active service and could bring home to the workers the life in the trenches and their relation to it visited hundreds of mining camps and addressed the workmen. A great amount of material, such as posters, poems, etc., that it was thought would appeal to the men and arouse their patriotism, was distributed and personal letters were written to workers who made unusual records.

In many districts, the production managers established the daily tonnage necessary from each mine and had the local production committee accept it as the Government's requirements. This was one of the most stimulating features as it gave the men at the mine a definite goal and they felt that the standard was set by the Government and not by the operator, so the unwilingness to work hard for the operator's benefit was more or less lost. The net result was a very large increase in production.

During the five very active months the National Production Committee spent in Washington, the members came in close contact with hundreds of operators, miners' leaders, and mine workers. All were keenly interested in increased production and frankly expressed their views as to the causes that impeded production and as to the steps that should be taken to increase it. We discussed what we called methods for increased production, but which were really methods of increasing the harmony and co-operation between employer and employee, which is the true basis on which increased production must be built.

Need a Stimulating Ambition in Workmen.

There is undoubtedly throughout the world, as is evidenced by the rise and spread of Bolshevism, a feeling that the good things have not been evenly divided; that some persons have had too much and many others too little. This is true in theory but it is difficult of correction. Doubtless the unequal distribution of wealth is due to the unequal distribution of worth, and until worth is equally distributed there can be no permanent equal distribution of wealth. It

*Director of Production, U. S. Fuel Administration.

seems essential, therefore, to make an earnest persistent effort to emphasize the need of worth and to do everything possible to stimulate it. The Bolsheviki are trying to distribute wealth on the basis of might and disaster can be the only result of the effort. Is not the promotion of worth the proper counter-irritant to Bolshevism?

We, operators, as the pace-setters in the coal industry, must do our part. Our workmen must be, much more than ever, a matter of deep concern to us. We must plan well and unselfishly for their general well being and must use every effort to stimulate them to greater efficiency as to labor and to higher ideals as to the proper use of their lives. There must be created an ambition for more comfortable homes, and better food and clothing for themselves, their wives, and their children. The education of their children also must become one of their main desires. Now, their dominating desire is more leisure; fewer hours at work is their goal and increased wages help them to attain it but at the expense of production. This ambition is disadvantageous both to the men and to the operators and the only way to relieve the conditions it produces is by creating new ambitions and aims. A man who needs $30 a week to live in his accustomed manner and who can earn $5 per day, will work six days a week. If his earning power is increased to $7.50 a day, he can earn the $30 a week necessary by working only four days, so there will be a tendency on his part to decrease his working days from six to four. This is uneconomical for all parties. By stimulating in the man higher aims and ideals, which will require more money for their satisfying, will not only increase his desire to work but will also tend to change his work into service. These aims and ideals will make him feel that his work is not merely dull toil but that it is an honorable means of enabling him to gratify his higher ambitions. The war has paved the way for this work on the part of the operators, for during the past 18 months, as never before, the work of the American workmen has been service in a great cause and now that the thought of work being service is in their minds, every effort should be made to intensify the thought and make it permanent. Surely war conditions cannot be a greater stimulant along this line than can peace conditions.

It is the duty of some one to promptly take this whole matter in hand; and if it is the duty of someone, surely that someone is the employer. He is the one who, by birth, environment, or some special virtue, is the one to whom this should appeal and he is the one best equipped for the leadership. The average workman is not just as we would want him to be, but that is no fault of his. He is the product of his opportunity. If we want him to be better, we must make for him a better opportunity. We get nowhere by complaining or by destructive criticism, but we can accomplish much by putting our shoulders under the wheel and lifting with a true desire to help for unselfish reasons.

If we are to assume this leadership we must first make firm our standing with the men along industrial lines. As yet the men do not feel that we actually owe them anything along the lines mentioned, but they do feel that we have certain industrial obligations. These we must meet and satisfy the men that we are fair employers before we can expect to exert an influence along higher lines. The men now look upon us with suspicion. They feel that we are their enemies, that their best interests conflict with our best interests, and that we constantly try to take advantage of them. In days gone by, and to some extent today, many employers do try to take advantage of their workmen in an unfair way, so that the workmen are suspicious of all employers.

Industrial Obligations of Employers to Men.

The men feel that there are two industrial obligations on the part of the employer toward them: The first one is that the wages and working conditions, as defined in the scale contracts, must be met. We employers acknowledge this obligation, which is virtually a legal obligation and cannot be shaken off. individual failures. Nevertheless, if deposits so valuable pass into private ownership, there is nothing unreasonable in regarding them as charged with a lien in the form of a demand that a fair share of the profits derived from working them shall inure to the public benefit.

Twenty-five years have seen a great change along this line. Not only do the operators for the most part make an honest effort to abide by the scale agreements but they have set up courts of arbitration so that disputes under the agreements may be adjudicated by an impartial tribunal. The one fly left in the ointment, in this regard, is that very many men feel that the operator bitterly resents being taken before the board and that he will seek revenge against the man who brings the complaint. This feeling does away with much of the real virtue of arbitration. Every operator should make the men feel perfectly free to discuss their grievances with him and, failing to agree, to refer the matter to the board without any prejudice against the workman in days to come. If the operator is conducting his business fairly, he need have no fear of having his work reviewed by an impartial board.

The second industrial obligation that the employee feels should rest on the employer is that of making it possible for the employee to do a day's work when he reports for duty. This obligation the employer has not formally recognized in any way and it is the next step to be taken. We have recognized the first obligation and are very much better off for having done so. We must now formally recognize the second obligation and will be very much better off for doing that also. A new board should be set up or else the powers of the existing board should be broadened so that judgment may be passed as to whether or not the employer has failed in his duty of providing an opportunity to do a day's work. Before this board will come up questions as to whether or not the operator is to blame before a man is passed out, because his place contains water, because there is no timber or cars, and various other obstructions to good working conditions. A man feeling aggrieved along this line should be encouraged to bring the matter to the attention of the board for the effect of having fair judgment passed would be available. No mine foreman want to have an impartial board say that he is conducting the affairs in his mine in an inefficient way, so the very existence of such a board would be a tremendous stimulant to the mine management.

The board, also, should decide whether or not a workman failed in his duty by being absent from his work. There is just as much of a moral obligation on the employee to work, unless prevented by unavoidable causes, when there is an opportunity to do a day's work, as there is on the employer to furnish the opportunity. No good can result if the obligation is placed only on the employer. Both parties interested must share it. With these two obligations

acknowledged, with means provided for adjudicating differences of opinion regarding them, and with the men feeling that they are welcome to bring their complaints, we will have our industrial skirts clean and the decks cleared for active leadership along lines looking toward higher ideals and better manhood.

Obtaining an Equal Distribution of Worth.

We all know the main influences that can be made powerful factors toward a more equal distribution of worth. We must be keenly interested in the home, the school, the church, and all social activities, in fact, in everything going on in the community that has an influence on the lives of the people. Until now our thoughts have centered on material things, on mechanical devices, and along these lines we have made great progress; but we have paid little attention to the social, physical, and moral betterment of our employees. For the most part we have not tried to see that the boys entering our employ each year were better than the boys who entered the year before. We have given little thought to our workmen, excepting as workmen, and even then we have made no effort to teach them what we should. We have complained bitterly of their actions many times and yet have done little or nothing to better their environment and opportunity and to stimulate higher ambitions and ideals. We have engaged a young man as a fireboss, or a pitboss, and have said to ourselves "That young fellow is a comer. I'll make a real man of him." We should consider each one of our workmen a comer and try to make a man of him. All of this may sound theoretical and impracticable but it is not. It cannot be done in a day or in a year, but it can and must be done if the good things of this world are to be gradually and fairly divided on the basis of worth, and are not to be suddenly and unfairly divided on the basis of might. We, operators, are face to face with a condition that is exceedingly important and serious, and I believe we are strong enough to meet it in the proper way.

During the past eighteen months the President of the United States, in his various addresses and messages, has set up a very high standard. He has given to the world high ideals and every effort must be made to live up to them. The great mass of the people feel, in a hazy way perhaps, that peace is going to bring to the world better conditions; that there will be a more equal division of this world's goods; and that brotherhood will become much more a fact than before. It will be a keen and dangerous disappointment if the President's ideals do not prevail in large measure.

ENCOURAGING PROSPECTORS IN BRITISH COLUMBIA.

That the sum of $207,523 has been expended by the Provincial Government on aiding in the construction of roads, trails and bridges to mineral claims in British Columbia since the accession to power of the present Administration late in the year 1916 was announced in the British Columbia Legislature the other day by the Hon. Wm. Sloan, Minister of Mines. He explained that originally the vote for this purpose was $200,000, which sum had been supplemented during the session of 1918-19 by $75,000.

It is pointed out, in this connection, that the Government has adhered to its policy of encouraging the development of promising mineral deposits by assisting in the provision of transportation facilities ever since it was returned to office by the country. Since January 1st, 1917, there have been built ninety-eighth and seven-eighths miles of mining roads; seventy-five and five-sixths miles of mining trails; and there have been repaired 437¼ miles of mining roads and 420¼ miles of mining trails. These roads and trails, it is explained, all were of such a character as to be of service, almost solely, to mines in the first stages of development, or claims on which work was proposed, and which were sufficiently encouraging in their prospects to warrant the expendtiures. Under the terms of the "Mineral Survey & Development Act," which provides the Government power to extend the help indicated, the Government mining engineers, on receiving applications for aid in the building of roads or trails, must visit the district or the property it is intended to open up and make a report on the same. If their reports are favorable, showing that in their opinion the claims to be assisted are worthy of the same, the Minister of Mines may authorize the expenditure of 50 per cent. of the estimated cost.

Details of the expenditure along these lines during 1917 and 1918 are as follows:

"1. Total expenditure, $207,523.34.

"2. Alberni; Marble Cove Group, Copper Island, $500; Columbia Mines, Sproat Lake, $500; Canadian Mineral Claims, $500; Victoria Group of Mineral Claims, $200; Great Central Lake to Big Interior, $200; Monitor Group Trail, $500; Black Prince No. 2 Trail and bridge, $225.

'Atlin: Esperanza Group, Alice, Arm, $367; Bush Mines, Salmon Bear River Co., $5,000; Salmon River Wagon-road, $7,500; Georgia River Trail, $1,500; George Copper Mines, $500; Grey Copper Group, Bear River, $150; La Rose Mine Trail, $600; Maid of Erin Group, Rainy Hollow, $635.50.

"Cariboo: Proserpine Mount Mines, $500; Killam Cement Gravel Mines, $1,032.15; Upper Horsefly Road, $1,569.

"Columbia: Bugaboo Trail, $75; Brisco No. 3 Creek, $91.33; Boulder Creek to Siting Bull, $1.130; Boulder Creek to Relief Mines, $150; Boulder Creek to Pretty Girl Mine, $150; Brisco to Lead Queen, No. 3 Creek, $1,200; Canyon Creek Trail, $55; Canyon Creek Trail to 15-Mile Creek, $225; Giant Mine Road, $8.50; Horse Thief Creek to Mabel Road, $200; Horse Thief Road to Gallop Mines, $98; Paradise Mine Road, $109; Paradise Mine Bridges, $700; Spilimacheen Road to Warren Creek, $225; Tennessee and Tarheel Mines, $100; Toby Creek Cut-off, $11.500: Toby Creek Road, $422.-01; Toby Road above 11-Mile, $600; I.XL. Condor Mines, $30; Four-foot Trail above 11-Mile Post, Toby Creek, $500; Trojan Copper Mines Sleigh Road, $4,000; Carbonate Spruce Camp Bridge, $300; Carbonate Spruce Camp Trail, $200; Lead Queen Sleigh Road, Francis Creek, $1,050; Bugaboo Creek Trail (Mercier's), $50; Fred Ball's Trail, Mineral Creek, $250; Gallop's Claim, Horse Thief Creek, $298.

"Comox: Valdes Island Copper Mines, $3,000; Vanbert and Ophir Mines, $250; Blue Bell Mine Trail, $50.

"Cowichan: Blue Grouse Mines, $1,023.50; Jubilee Mines to Cowie Mineral Claims, $270.08; Robertson Silver Mines, $475.

"Cranbrook: Dibble Mine Trail, Fort Steele, $75; Society Girl Mine, $50; North Star Mine, $150.

"Dewdney: Molybdenum Stave River Pack Trail.

"Esquimalt: Section 93. East Sooke, $4,625; Leach River Trail, $300; Sunloch Mines, Jordan River, $7,500: McDonald Creek Bridge, $200; Sooke Lake, Leach and Phillips, $265.

"Fernie: Burton Mine, Elko, $1,000.

Grand Forks: Paulson-Christina Lake, $2,500; sig Claim, Norway Mountain, $200; Paulson-Molly son Mine, $150; Galloping Mountain Trail, $2,600; k Candy Group, $3,000; Gloucester Group, Maple f Claim, $1,200.

Greenwood: Big Copper and King Solomon Mines il to First Chance, Jim Hill, and St. Paul Mines; Galloping Mountain, Grand Forks), $200; B. C. e to Junction, $150; Providence Mine Road, $100; erprise Mine Road, $100; Standard Fraction Claims,); Castor Franction Claims, $101.37.

Kamloops: Dunn Creek, Windpass Group, $300; ia Group, Canyon Creek, $800; Copper King and eod Group, Seymour Road, $3,000; Seymour River ge, $1,000.

Kaslo: Cork Mine, South Fork Road, $2,500; Circle , Elsmere Group, $500; Levina-Butte Trail, $200; vser-Argenta Road, $2,500; Cultus Creek $1,500; n and Crescent Mines, Coffee Creek, $2,500; Jack- 's Wagon-road, $2,000; Bayonne Camp, Sheep ek, $100; Bannockburn Camp, Hall Creek, $900; coln Group, Spring Creek, $100; Ainsworth Road, 00; Tenderfoot Bridge (Porter), $750.

Lillooet: Sucker's Hill, Bridge River Road, $1,000; tier Line, Texas Creek, $125; Gun Creek to Copper untain, $2,500; Timothy Mountain Trail, $300; lath Siding, Bridge River, $362.50.

North Vancouver: Bowen Mines, Dorman's Ranch, 0; Indian River Trail Bridges, $3,000; Squamish- amit Trail, $100; Sun Group Trail, $1,554.37; Mam- m River Trail, $255; Tonquillo Creek Trail, $1,000.

Newcastle: Majuba Trail and Sutton Trail, $400.

Omineca: Road to Babine Bonanza Mining & Mill- Company, $150 and $15,674; Dockrill Road, Howi- Creek Mines, $21,600; Delta Copper Mines, $750; dson Bay Mountain Coronado Group, $200; Nine-mile Mountain Road, $2,500; Ashman's Coal Property Road, $500; Quartz Creek Trail, $250; Hudson Bay Mountain Sleigh Road, $4,000; Shaefer, Wood, Anderson Claim, $500.

"Prince Rupert: Drum Lummon Mines, $1,250; Pacific International Copper Company's Trail, $1,500; Tuttle's Account, Legate Creek, $500; Golden Wonder Mine, $125; Chindemash River Pack Trail, $100.

"Revelstoke: North Road Big Bend Trail, $17,000; Woolsey Group, Silver Creek, $2,300; Fish Creek Trail (Stuart), $150; Mastodon Mine Trail, $1,500; Mountain Chief Mine, $750.

"Rossland: Burlington and Anaconda Mines, $1,000.

"Similkameen: Red Star Mineral Claims, $100; Oregon Group Trail, Hedley, $250; Princeton-Copper Mountain, $1,000; Summit Camp Trail, $200; Coalmont to Tulameen, Granite Creek, $350; Tulameen River Bridge, $500; Pack Bridge, Champion Creek, $550; Treasure Mountain Group Trail, $50.

"Slocan: Carnation Mine Trail, $300; Echo Mine Road, $2,434; Silverton-Four-mile Road, $1,500; Elkhorn Mine Railway Siding, Sandon, $1,000; Ten-mile Creek Road, $500; Springer Creek Road, $500; Millie Mack Trail, $450; Sand Creek, Lighting Peak Trail, $107.25; Sovereign Mine Road, $483.48; Arlington Mine Road, $200; Victor No. 6 Mineral Claim, near Sandon, $80.

"Trail: Gordon Group Trail, $187; Headland Trail, $153.70; Lost Creek Trail, $520.95; Wild Horse, $100; Ore Hill Road to Sheep Creek, $450; Reno Trail, Downey Brook Group, $500; Eureka Mine Road, $525; Noonday Group Trail, $375; 49-creek Road, Gold Hill Group, $200; Aspen Mine Trail, Deer Creek, $350; Hall Creek to Copper Mountain, $100; Southern Bell Mine Trail, $200; May and Jennie Mill, $50.

Industry Must Bear the Cost of the War*

By D. B. DOWLING.

We rejoice that we are able to welcome many who e returned from the scenes of their brilliant ex- its on the western battle front and to have the urance that soon the remainder will be coming ne. It is gratifying to know that our engineers e demonstrated their heroism, tenacity, skill and lity to construct military works or to take part in rations which showed their great adaptability and tiative. We rejoice also to know that the fire of riotism burns as hotly in the breasts of the mining gineers and miners as in any class, and that their h to participate was only checked by the absolute d of the nation for their services to help provide l and material for munitions.

With the present meeting the Canadian Mining In- ute attains its majority. The event occurs at a mentous period in the history of Canada. We have npleted a campaign in which Canada has shown virility as a belligerent nation. She has now to w her ability to recuperate under very trying con- ions and for the first time without help outside her own resources. As a new nation in the British Empire, our cousins and neighbors have shown that we are accepted in their affections in a somewhat more intimate association, a relationship which may be likened more to that of brotherhood. The Joint Meeting of the American Institute of Mining Engineers with the Canadian Mining Institute, held in New York in February, has shown the close bond of sympathy that exists and we are glad in turn to welcome them at our meeting and with them rejoice at the successful termination of the war.

We meet together to celebrate the coming of age of the Institute. From small beginnings it has grown to be representative of the mining engineers and the mining skill of Canada. Our doors are opened wide to those whose study or experience makes them an asset to Canada in the working out of the problems that are to be met with in the proper utilization of mineral resources. As an Institute we have reached our majority at a time when our responsibilities have greatly increased over pre-war conditions.

As a people we have a debt to pay and we must realize that **it must be by industry.** The proper utilization of labor, to gain the maximum return for the nation,

*Presidential address, Montreal Meeting Canadian ning Institute, March 5, 1919.

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must be the great problem of the future. **Our self-evident fact that seems to be worth our earnest consideration is that unskilled labor produces the smallest return. To make us efficient, technical education in all lines should have a prominent place.**

To many of the nations of the old world the scope of labor is restricted; to some the production of food and clothing is the main avenue; to others the possession of fuel has opened the way to manufacturing; while some of the small states depend on the production of the various raw materials. The depletion of national assets is greatest when the production consists of mineral materials alone, less where manufacturing is the main industry, and least where the products of the soil are the commercial assets.

The depletion of national resources is one of the serious problems facing the nations of Europe and is the cause of much of the insecurity felt by the smaller powers. The large organized powers have cast covetous eyes on the mineral riches of their weaker neighbors—the plea for a place in the sun advanced by Germany being merely an excuse to rob her neighbors, since the outer world seemed pre-empted. The close of the war renews the economic strife to maintain manufacturing supremacy, and with it the attempt to conserve raw materials within and for each nation. Those not favored by trade and manufacturing advantages will find large outside markets for their resources. This opportunity will be offered to Canada, but if we are to build up a self-sustaining country our known ability to provide foodstuff for a very much larger population should be taken advantage of along with our natural power resources to foster many other industries.

We are happily situated. We do not find ourselves restricted as to our agricultural products, and happily for us the revenue derived from the products of agriculture forms a large addition to our income without a corresponding depletion of our assets. For manufacturing we have large sources of power from fuel and waterfall. The natural power is one of our greatest assets and its utilization like the production of food is not a charge against our resources.

Our highest aims economically should therefore be to develop our basic industries, notably agriculture and mining and also our manufacturing, which in turn will provide our own markets for raw materials. Following our arguments, the manufacture of foreign raw materials may be of advantage, as has been found in England, but we must remember that very soon the purchase of foreign unmanufactured articles will become increasingly more difficult so that without a domestic supply there will be a restriction of activity and there would probably set in a tide of emigration to other centres of population.

Our mining interests will always have markets for their products, but it seems desirable that these products be utilized at home. Many of our resources of the less precious materials have been neglected and Canada has spent vast amounts to keep foreign labor employed, when the materials could be fabricated at home.

The return of the army has been considered as a labor problem and the attention of private and governmental committees will be centered upon placing this body of men at remunerative work as quickly as possible. This may artificially stimulate the manufacturing industry, but to maintain the economic equilibrium agriculture and mining must also be fostered. To keep up the supply of raw materials for the many industrials in existence and to provide material for other possible ones will be a national obligation. The responsibility lies very heavily on the members of the Canadian Mining Institute; on the mining engineer to economically and safely recover the mineral riches; on the prospector to test and examine our prospective ore bearing areas; and on the explorer and geologist to examine the larger regions and show the way by maps and reports to the additional possible areas or to call attention to new minerals and their possible use in the arts or manufactures.

We know that our public men are alive to the needs of the country during the constructive period; but they require the help of everyone in forwarding their projects. To encourage prospecting when mineral prices fall is no easy matter. Help may come from an unconsidered source. The chemical industry or the metallurgical industry may send out the call for material that the prospector may readily find. The various governments are no doubt considering possible schemes for the encouragement of prospecting¼ but the burden of a general exploration of the country has long been on the Federal Government and very much of the success of this work must be credited to the Geological Survey. During the war many of the staff have been employed overseas, and the efforts of the rest turned to work, more or less directly connected with the supply of munitions. Now, with their return, an enlarged programme is being arranged and this is facilitated by the fact that the Minister of Mines is fully alive to the need of the many interests.

In closing it is with a great deal of pleasure that your President can assure the Institute that the publications of the Department of Mines will in future be facilitated by the personal attention of the Minister of Mines, the Honorable Martin Burrell.

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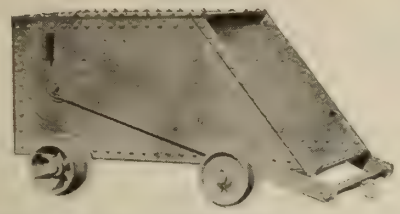

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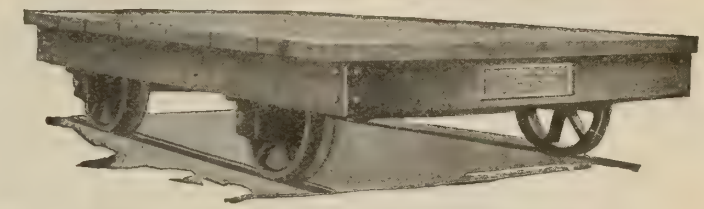

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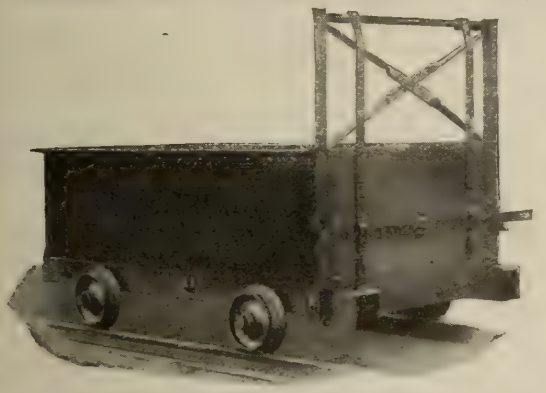

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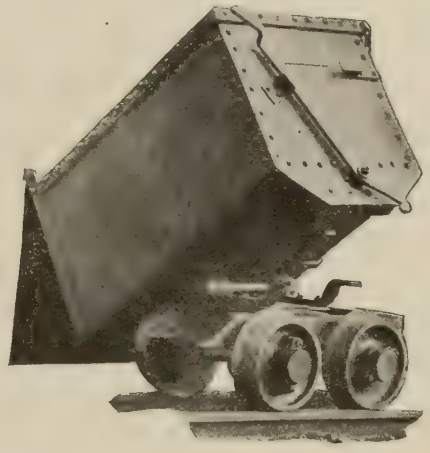

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Shipments to Trail Still Large.

Considering the unsettled state of the metal market since the armistice, and the total lack of market of any kind for lead and copper, and practically the same condition affecting spelter, the showing of ore shipments to the Trail Smeltery for the first two months of 1919 is very satisfactory, 65,733 tons of ore and concentrates having been received in that time. This is even more than it was over the same period of 1919 when the total was 61,393 tons. A year ago, however, Trail was just recovering from the smeltermen's strike of five weeks, so that the 1919 total for the first two months may more properly be compared with the first two months of 1917, when ore shipments reached 77,537 tons. There were then no ripples on the horizon so far as the metal market is concerned and the war demand from overseas was most insistent.

The Minerals of Nova Scotia

THE MINERAL PROVINCE OF EASTERN CANADA

COAL, IRON, COPPER, GOLD, LEAD, SILVER, MANGANESE, GYPSUM, BARYTES, TUNGSTEN, ANTIMONY, GRAPHITE, ARSENIC, MINERAL PIGMENTS, DIATOMACEOUS EARTH.

Nova Scotia possesses extensive areas of mineral lands and offers a great field for those desirous o investment.

Coal Over six million tons of coal were produced in the province during 1916, making Nova Scoti by far the leader among the coal producing provinces of the Dominion.

Iron The province contains numerous districts in which occur various varieties of iron ore, practicall at tide water and in touch with vast bodies of fluxes. Deposits of particularly high grad manganese ore occur at a number of different locations.

Gold Marked development has taken place in this industry the past several years. The gold field of the province cover an area approximately 3,500 square miles. The gold is free milling an is from 870 to 970 fine.

Gypsum Enormous beds of gypsum of a very pure quality and frequently 100 feet thickness, a situated at the water's edge.

High grade cement making materials have been discovered in favorable situations for shipping.

Government core-drills can be had from the department for boring operations.

The available streams of Nova Scotia can supply at least 500,000 h.p. for industrial purposes.

Prospecting and Mining Rights are granted direct from the Crown on very favorable terms.

Copies of the Mining Law, Mines Reports, Maps and other Literature may be had free on application t

HON. E. H. ARMSTRONG, - HALIFAX, N.S.

Commissioner of Public Works and Mines

PROVINCE OF QUEBEC

MINES BRANCH

Department of Colonization, Mines and Fisheries

The chief minerals of the Province of Quebec are Asbestos, Chromite, Copper, Iron, Gol Molybdenite, Phosphate, Mica, Graphite, Ornamental and Building Stone, Clays, etc

The Mining Law gives absolute security of Title and is very favourable to the Prospector.

MINERS' CERTIFICATES. First of all, obtain a miner's certificate, from the Department in Quebec or from the mine agent. The price of this certificate is $10.00, and it is valid until the first of January following. This certificate give right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

SIX MONTHS AFTER STAKING. At the expiration of six months from the date of the staking, the prospector, retain his rights, must take out a mining license.

MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of $10.00 on issue. It is valid for one year and is renewable on the same terms on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of $5 an acre for SUPERIOR METALS, and $3 an acre for INFERIOR MINERALS

The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec north of the height of land, where important mineralized belts are known to exist.

PROVINCIAL LABORATORY. Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY, 228 ST. DENIS STREET, MONTREAL, for the determination, assays and analysis of minerals at reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

HONOURABLE HONORE MERCIER,

MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC.

EDITORIAL

EDITORIAL NOTES

The British Columbia Chamber of Mines will not allow the hold they have secured by the success of this Convention to slip. They will continue a publicity in B. C. on the plane which it deserves.

Many mining men who have followed their calling for years were most forcibly impressed by the minerals displayed and the figures shown by the different engineers of the Provincial Government. These reports impressed them with the great possibilities of British Columbia.

The Convention was successful from every point of view and demonstrates what the get-together spirit will do when applied properly and British Columbia must not let the results of this Convention stop at this. The chance is here to drive home the publicity campaign which is already started and which will bring results of untol value to the Provinces, if properly followed up.

Mr. Rickard's address is well worth perusing and will give the investor something worth while to consider. British Columbia wishes investors to look at the mining possibilities in British Columbia from Mr. Rickard's point of view and the results of any investments made by them in B. C. properties should certainly be worth while if they follow the precepts as laid down in this address.

When mining men from Grand Forks, B.C., are registered at the Convention in Vancouver as delegates from the Northwest Mining Association of Spokane, Wn., bringing credentials from that Association, it surely shows that British Columbia has not looked after her interests properly. It also shows how other places have used the opportunity to turn out and keep in touch with the mining fraternity at every chance.

The response to the invitation from the British Columbia Chamber of Mines to the members of the mining fraternity to attend the first Annual International Mining Convention at Vancouver on March 17, 18, 19, far exceeded expectations. The result has been one of the greatest mining conventions ever held on this continent. The British Columbia Chamber of Mines certainly appreciates the response made to their invitation. From the results of this Convention the British Columbia mining industry has received an impatus which, without doubt, will carry it far as regards future results.

DEVELOPMENT OF MINERAL DEPOSITS IS A BUSINESS FOR THE VENTURESOME

One of the best things of the Vancouver Convention was the address by Mr. T. A. Rickard on "Mining: An Investment, A Speculation, or a Gamble?" We reproduce it on another page. We commend it to the attention of those who would attempt by legislation to remove the risk from investment in mining enterprises. Those who would heavily tax the mining industry may also read it with profit. More particularly we would call it to the attention of all who put their money in mining ventures. Such addresses will help to keep the very timid out of the industry and will at the same time attract the venturesome. Mining is a hazardous business as well as a hazardous occupation for the workers. It is a business for the strong, not for the weak. It is a business for the venturesome, not for those who are unwilling to run big risks.

There are fortunately in Canada many well established mining companies, employing large numbers of men and doing a profitable business. The big operating mines are the backbone of the industry, a great national asset. But to many of us the history of a property from the time of its discovery until it becomes a producing mine is much more interesting than its later history. Mines that are, are not so often in our minds as mines that may be.

We can sometime spredict from surface examination what the results of development work in a new area may be. But such predictions are at best, a mere approximation to the truth. To obtain more information it becomes necessary to spend money, sometimes large amounts, in development work. It is well that those who provide the money should understand they run big risks.

We belive that there are plenty of people willing and able to risk money in developing mineral deposits, so long as there remains the possibility of some being richly rewarded. In Canada we have splendid opportunities for such adventurers. They should be encouraged by honest treatment, not discouraged by unfilled promises of certainty of success.

ROYALTIES UNDER DOMINION LAWS.

Until recently, the regulations affecting minerals occurring in quartz on many Dominion Lands have not been subjected to serious scrutiny. During the last few years, however, in which considerable interest has been taken in gold and copper properties in Manitoba, criticism has necessarily been somewhat more pointed. The change from a freehold system to a leasehold system, and the fact that that change was made by Order in Council, stirred the interest of all who were seriously concerned with the future of mining developments in this district. It is noteworthy that no action has yet been taken on this matter by any organization without the boundaries of Manitoba. More recently, however, it has been realized that another situation connected with the regulation for the disposal of quartz mining claims demands attention. In Clause 94 of the Regulations it is stated that "The lease of a mineral claim shall reserve to the Crown such royalty on the sales of the products of the location described in such lease as may from time to time be fixed by Order in Council —the royalty to be collected in such a manner as may be prescribed by the Minister."

The developments in Northern Manitoba have now reached the stage where exploring companies of standing are willing to invest considerable capital in preliminary development work. It is necessary, however, for such companies to look ahead to the period of production, and to the probable action of the State in exacting taxation. While it may be freely admitted that the subject bristles with difficulty, and while it cannot be reasonably expected that an absolutely clear cut policy be laid down in the Regulations, it is none the less clear that the clause above quoted is so lacking in definiteness and concreteness as to be objectionable to the investor. There have been several instances of companies, desirous of carrying on exploratory work in this territory, who object in no uncertain terms to the vagueness of the above quoted regulations. On another page will be found the text of the resolution passed by the Manitoba Branch of the Canadian Mining Institute on this matter. As in mining laws generally, so in taxation, the experience of the Provinces is wide and varied; and a discussion on the regulations adopted by the Department of the Interior would doubtless be illuminating.

A SUGGESTION.

"Why could not mining flotations be put under the jurisdiction of the Bureau of Mines?" Such is a suggestion now being made by some of the most conservative mining men in the business.

Why couldn't they? There appears to be no reason why they could not and should not be. The Bureau of Mines, through the Mining Commissioner, and through Mining Recorders in each mining division, is in a position to benefit from the advantage of opinion in the mining fields. By adding to its already competent staff of geologists, which staff would have authority to enter any mine at any time and report to the government, the Bureau of Mines could readily recognize false or misleading literature circulated for the purpose of selling stock. In other lines of business punishment is handed out to those who get money under false pretences. Why not enforce similar measures in the business of mining? Such a plan would quickly eliminate the wildcat. Incidentally, it would give added impetus to honest mining.—J. McR.

MANITOBA BRANCH OF CANADIAN MINING INSTITUTE.

A meeting of the Manitoba Branch of the Canadian Mining Institute was held at The Pas on March 17th, at a time when the town was en fete by reason of the Hudson Bay Dog Derby, which was the season's event in the Northland. It was decided to make this an open meeting, and there was a very large attendance in the Assembly Hall of the Community Building. Two papers were presented to the meeting.

Mr. G. R. Bancroft discussed "The History and Possibilities of Prospecting in Northern Manitoba." The author dealt with the earliest period of prospecting in the copper and gold areas, in which he had taken a considerable part. He went on to deal with the present situation, and took up in detail the features of the various districts where discoveries had been made within the last two years, the nature of the surface indications, and the general economic possibility.

Mr. H. C. Carlisle gave a paper on the Mandy Mine. Mr. Carlisle, who has been manager of the mine for the last two and a half years, discussed somewhat fully the mineralogy of the orebody, the folding and faulting systems, and there relationship to the high grade copper sulphide lens and the low grade general orebody. He dealt with methods of operations that have been adopted in excavating the high grade lens and discussed the economic situation with reference to the mixed copper, zinc, and iron sulphides blocked out in the mine.

A general discussion ensued, and several matters relative to developments in the district were taken up. The question of royalty regulations applicable to quartz properties was taken up, and a committee consisting of Messrs. Bancroft, Bunting and Vickers was appointed to draw up a resolution. The following resolution was then unanimously adopted:

"Whereas in the regulations for the disposal of Quartz Mining Claims approved by Order in Council dated May 25th, 1917, it is laid down in Section 94 that such royalty may be reserved to the Crown on the sale of the products of leased claims, as may from time to time be fixed by Order in Council;

"And whereas in the experience of those interested in furthering the development of mining in Manitoba it has been found that the terms respecting the matter of fixing royalties on leased properties are so indefinite that financiers hesitate to support exploration enterprises until a more concrete plan of charging royalties is outlined:

"Therefore be it resolved that the Manitoba Branch of the Canadian Mining Institute assembled in session at The Pas unanimously request the Council oft he Canadian Mining Institute to present the situation outlined above to the Minister of the Interior, and to recommend that the section referring to royalty be so amended as to give as clear an idea as may be of the plan which the Government intend to adopt in charging royalties on operating mines; and further to indicate whether it is the policy of the Government to permit mining companies to operate for a certain period of years before royalties are charged on their properties."

The chairman of the meeting was Mr. R. C. Wallace, President of the Manitoba Branch.

The Vancouver Mining Convention

March 17, 18 and 19, 1919.

With representative mining men in attendance from as far south as California, and as far north as the Yukon and with every intervening mineral section represented by leading mining men, the first International Mining Convention ever held in the City of Vancouver opened on Monday, March 17, and closed on Wednesday the 19th. The Convention in every way was a success. Its first feature was a stirring address by the Honorable William Sloan, Minister of Mines, and its closing incident was the ringing appeal of M. J. Carrigan, of Seattle, Washington, to all interested in the promotion of the industrial welfare of the Pacific North-West to unite in a determined effort for the establishment of an iron and steel industry either on the Canadian or American side, or both. Mr. Carrigan dwelt on the fact that Mr. Sloan had been the first man in public office to declare in unqualified terms that British Columbia possesses iron ore in sufficient quantity and of such quality to permit the opening and permanent continuance of a furnace modest in size in this province. He congratulated the Minister of Mines on the courage of his statement, and the vision which it indicated. He stated that he had known this to be a fact for fifteen years, but that Mr. Sloan had been the first man in a responsible position to publicly make the announcement. Reference was made also to the very great importance of such an industry, if the shipbuilding of the Pacific Northwest, the foundations of which have been laid through the exigencies of the war, is to be perpetuated.

Addresses.

There were many notable addresses during the Convention, but before referring to them, the British Columbia Chamber of Mines should be congratulated on the splendid judgment exercised in the preparation of its programme and in the satisfactory manner in which it was carried out. Vancouver is not essentially a mining town, but on this occasion, if the very large crowds which thronged the Vancouver Hotel is any criterion, a large proportion of the leading merchants, business men and citizens generally turned out, both to welcome their visitors and to acquire information as to the mining possibilities and the future of mining in their Province and in the countries adjacent. Certainly they gave the delegates from outside points a warm welcome and treated them with every hospitality and consideration. Reverting to the addresses, it is fitting that brief introductory reference be made to that of Mr. T. A. Rickard, of San Francisco, California, the subject of which was "Mining as an Investment." Couched in simple, but effective, language, and containing the essence of long years of experience as a mining man, it was a liberal education in itself and furnishes a guide to those contemplating such investment which could not well be bettered. Then there was the address of Mr. H. M. Lawrie, Chairman of the Oregon Bureau of Mines on "Gold." In view of the exceptional interest in this subject, to say nothing of the very able manner in which it was handled, in this case, keen interest was manifested by the assembled delegates. Some of the other papers may be briefly enumerated as follows: "Government Control of Smelters," Sydney Norman, Spokane, Washington; "The Better Preparation and Utilization of Coal," G. W. Evans, Coal Mining Engineer, Northwest Experiment Station, U.S. Bureau of Mines, Seattle, and Francis W. Glover, Princeton Coal and Land Company, Princeton, B.C.; "The Prospector, What He Should Be and How to Encourage Him," J. P. McConnell, Vancouver; "Taxation of Mines," Valentine Quinn, Granby Consolidated Mining and Smelting Company, Vancouver, B.C., T. W. Bingay, Consolidated Mining and Smelting Company, Trail, B.C., Nicol Thomson, Chairman, Mining Committee, Board of Trade.

The Price of Silver.

There were not many resolutions acted upon by the Convention, but several of them are of first importance. That which may be said to take premier position in this respect relates to the fixed prices placed on silver. The resolution asked that the Canadian Government use its influence with the Government of Great Britain with a view to the abolishment of the present fixation of the selling prices of this metal. The mover of this resolution claimed that the authorities were not treating silver fairly, following out the policy indicated. He said that Canada, as a producer of silver, was losing a lot of money as a result of this action, placing the figure roughly between $4,000,000 and $5,000,000. His opinion was that no argument could be advanced to justify the maintenance of this fixed rate, it was unjust to the producer and unjust to Canada and he expressed the hope that the Convention would not hesitate to go on record in favor of its abolishment. Silver, like any commodity should, now that the war is over, be permitted to find its own level as to price. He was convinced personally that, if this course were pursued, silver would rise considerably above a dollar an ounce, as the demand was great and would, beyond a doubt, grow greater as time went on. There was a market for any quantity in the Orient, Russia, as was true of any country which is misgoverned as those are. Being distrustful of those placed in power, the people horded their gold and their silver, and the latter was particularly in demand as a medium of exchange. It was only fair to those who are producing this metal that they should be allowed to reap any reward that might be coming as a result of these conditions. He predicted that silver, if placed on the market without restriction would advance to $1.20, $1.30 and perhaps $1.40 an ounce. Mr. Smith Curtis was responsible for the foregoing observation, and he was endorsed by Mr. T. A. Rickard, as well as by the great majority of the delegates including Mr. G. A. Caldwell, who represents the producers of the boundary district of British Columbia. Mr. Caldwell spoke very vehemently, and warmly endorsing the sentiments expressed by Mr. Smith Curtis and declaring that the fixing of the price of silver was the work of plutocrats. He expressed the belief that Governments these days were particularly keen to keep their fingers on the pulse of public opinion; that Governments would be careful under present conditions to do nothing that could be avoided antagonistic to the general sentiment; and that if the International Convention went on record in this matter it might have the desired effect at Ottawa. There was some opposition to the proposal, several speakers asserted that the policy with respect to silver had been adopted by Great Britain only after very careful consideration in order that the social equilibrium of the Indian Empire might be maintained. They declared that any interference with this would embarrass the Government of Great Britain and that under the cir-

cumstances it would not be wise to take the action suggested. Their view was that it was an Empire question and that the question of the welfare of the Empire should be placed before any monetary advantages to Canadian silver producers. The resolution, however, carried.

A Government Exploration Party.

Mr. S. S. Fowler, of Nelson, B.C., was sponser for a resolution proposing that the British Columbia Government be asked to provide for and equip an exploratory party, the duties of which would be to explore the vast North-Eastern section of this province, of which to date very little is known. It was true, Mr. Fowler said, that the section referred to from what little information was available did not seem to offer exceptional promise as a mineral producing zone. Very little, however, could be told of the resources of the region in question and he was of the opinion that the Government would be amply repaid for the expenditure that might be involved in assembling detailed data relating to the territory he had in mind. He instanced the Black Hills of Arizona as being a striking illustration of what an unpromising district may ultimately develop into. Every one knew the Homestake Mine of the Black Hills. It had produced millions of dollars in gold and there were associated with it other gold producing properties not as much heard of because overshadowed by the Homestake. But the Black Hills originally had been looked upon as barren of mineral of any kind. Was it not possible, he asked, that the vast unexplored region lying along the northern boundaries of British Columbia did not possess such riches as these. It was a section 107,000 square miles in extent, only ten per cent smaller than Great Britain and Ireland combined. At any rate he felt that the Government should undertake such work as suggested. Mr. Fowler's resolution met with the hearty approbation of the Convention and was carried without dissent.

University Education.

That the Provincial Government should be asked to provide a more substantial vote for the carrying on of educational work at the University of British Columbia was the purport of another resolution. Mr. Smith Curtis, in dealing with this, pointed amid some amusement that the University of the Province, notwithstanding the first importance of the mining industry of the country, was allowed only $15,000 this year for the maintenance of its geological and mineralogical departments. He declared that it was very important, in order that Canada maintain a high position industrially, that the technical education of its young men and women be of a high standard. This could not be more aptly illustrated than in the case of Germany, which country had gained its prominence in the industrial world through its system of intensive technical education. He was not by any means suggesting that the example of that ruthless Empire should be followed in its application of knowledge but was strongly of the opinion that, in order to obtain the best results in the development of the country's natural resources, provision should be made for teaching the younger generation all that modern science has to offer. For these reasons he endorsed without qualification the proposal that the Provincial Government be asked to provide more generally for its mining educational facilities of the University of British Columbia. This resolution also carried with enthusiasm.

Other resolutions, all of which were endorsed, may be summarized as follows:

Other Resolutions.

That the Provincial Government be asked to provide an Assay Office and facilities for the assay of ore at Prince Rupert, British Columbia.

That the Minister of Mines for British Columbia be requested to arrange for a tour through British Columbia with a party of British and American Mining Engineers, expenses of the same to be defrayed by the Government of British Columbia.

That the Department of Trade and Commerce be requested to arrange for the filming of British Columbia mineral samples and to use said pictures in connection with the advertising programme it now is preparing.

That the Postmaster-General of Canada be petitioned to remove the present restrictions placed by the Dominion on the importation of such second-class mail as representative American mining magazines.

That Members of the Convention assist in a movement proposed by the Spokane Chamber of Commerce, having as its object inauguration of a campaign of cleanliness in America (the idea of the Spokane Chamber of Commerce is to endeavor to induce the large cities to begin repainting their public buildings as well as private dwellings on a large scale. It was pointed out that this would increase the consumption of paint which is made up of a very large percentage of lead, and that, if the movement is successful, it not only will do good in the improvement of the appearance of communities, to say nothing of the improvement of sanitary conditions, but will in a very short time remove the present embarrassing surplus of lead.

The Opening.

The International Convention opened at 10.30 o'clock on Monday morning, March 17th, a short address of welcome being delivered by Acting Mayor Woodside. He congratulated the Chamber of Mines on the representative character of the gathering, referred to the importance of the mining industry to Vancouver as well as to the country generally and assured the visitors of the hospitality of the city of Vancouver. He advanced the suggestion that the work of opening up mining possibilities of the Province might be greatly assisted by the returned soldiers. There were many of these men unquestionably who would not wish to go on the land, and it was his opinion that the Government would be well advised to extent those who might wish to prospect what small assistance might be necessary. He concluded by expressing himself as assured that the deliberations would be productive of much good, and the hope that all associated with the gathering would have not only a profitable, but an enjoyable time.

Mr. A. M. Whiteside, President of the B.C. Chamber of Mines followed. His discourse was the same general character as the preceding speaker, but he continued by giving an outline of the programme prepared for the entertainment and edification of the delegates. Honorable William Sloan, Minister of Mines, then was introduced and formally opened the Convention in the following terms:

The Address of the Minister of Mines.

It is in my opinion a great honor to be permitted to perform the official duty of opening such an International Mining Convention, the first of its kind to be held in Vancouver. I wish, therefore, Mr. Chairman and gentlemen, to assure you at the outset of my appreciation both of the honor accorded me and of the responsibility of my task. My experience is that it is important that a Convention such as this should start well in order that it may progress and finish well. The proper understanding of our subject in gathering together should be developed and we should from the beginning allow full scope to that fraternal spirit and that common enthusiasm which mean everything if we are to derive the full benefits, in instructions and entertainment, from our three days association.

I want to congratulate the officials and members of the British Columbia Chamber of Mines. It is only necessary to glance about this hall, and to note the representative gathering of mining men, men of all classes of mining and from all parts of the Western Continent, to realize that the Vancouver Organization already has scored a pronounced success. We have visitors, distinguished visitors, here from California, Oregon, Washington, and other states of the neighboring republic, and I would be remiss if I did not, at this point, explain to them, not only as Minister of Mines of the Province of British Columbia but as a citizen of Canada deeply interested personally in the advancement of the mining industry in this country, that they are most heartily welcome. We are indeed glad to see them, and we shall look forward to hearing their views on the varied problems we are all facing as well as to the few days of pleasurable association before us. They have come, in most instances, from long distances to take part in the discussions which our programme proposes and to assist by giving us expression of opinions gained, in many cases, from practical and long experience. We appreciate their presence, we shall listen to and profit from what they have to say, and we sincerely hope that they will enjoy in every sense their stay in this city. As Minister of Mines I wish also to express my appreciation of the large attendance of British Columbia mining men. It is a pleasure to witness so practical a demonstration of their interest in the mining industry. I am sure that they will find their time well spent, in fact that must already be patent to them, at least to those of them who have had the opportunity before this of inspecting the very creditable exhibition which the British Columbia Chamber of Mines has prepared for our edification. And now just let me say that in my judgment it would be difficult to arrange for an event with greater possibility of good results in the advancement of the mining industry of the American West. I use the term "American" because it is applicable to the entire North American Pacific Coast, and I take it that the presence here of representatives from California to the extreme British Columbia North means that we appreciate that our interests, in so far as mining and its allied industries are concerned, and in no sense divergent but, in all their big and real problems, of a common nature. It is, therefore, very pleasing to face a Convention so constituted because of the confidence it gives that we are prepared to go forward, should to shoulder, with the united purpose of developing the great mineral resources of our united countries.

Now I might launch into an exhaustive account of the history of the mining industry of our province from the earliest years of its settlement, but it is not my intention to so occupy your time. We have all read with keen interest of the discovery of coal in the early fifties on Vancouver Island and know of the subsequent development of that industry; most of us are well acquainted with the chief incidents of the Cariboo gold rush in the Sixties, and I venture that there are few mining men of this Province who have not listened to romantic stories from the lips of our worthy pioneers; there are men within hearing who could recount anecdotes of fortunes made by lucky holders of stock in those companies which sprung into prominence when Rossland Camp came into its own; and there are many here, no doubt, who are capable of giving a connected history of the development of the metalliferous mining of Kootenay, Boundary, and North and Southern Coast Districts of the Province. For myself I could, were I so inclined, regale you with some stories of the Klondyke, of fortunes made and fortunes lost overnight, of hardships endured and grim struggles having for their goal both life and gold, that would make the misfortunes of Robert Service's Sam McGee look tame. But again, I am not going to inflict these upon you. We are not here, I assume, to turn our eyes back in contemplation of the past but rather for the purpose of casting our eyes forward and preparing, in some measure, for the great task that lies before me.

A Good War Record.

It is interesting, however, for a moment that we should give ourselves the satisfaction of considering British Columbia's mineral production for the year 1918 because the record created, according to the conservative estimate prepared by the Department of Mines, is one upon which all our mining men may congratulate themselves. I trust that our visitors will not think that we are "patting ourselves on the back" unduly when I point out that the value of British Columbia's output for the last year was greater than that of the previous year while decreases are shown in six of the adjoining states. I refer to Utah, Nevada, Idaho, Colorado, California and New Mexico. The monetary value of the production of the Province for 1918 was $41,083,093, which is $4,072,701 greater than 1917, or the equivalent to an increase of 11 per cent. Only once in the history of the Province's mineral statistics has this output been exceeded and that was in 1916. And it is specially gratifying to contemplate the results of 1918, when it is remembered that 1916 was a phenomenal year, metal prices being abnormally high owing to war conditions.

If we take metalliferous mining alone we find that the difference as to value of output is not substantial, the total for 1918 being $27,288,161 and that for 1917, $27,284,474. These figures, however, are not a fair basis on which to estimate actual production for the reason that the war in 1917 was at its heighth and prices still were in the same position while in 1918 they began to drop. Thus we find that, while in 1918 our mines produced 63,387,010 pounds of copper as against 59,007,565 pounds in 1917, there is a decline in value of $356,310. We also produced more lead last year but again, owing to price, a decrease is shown as to valuation. As to zinc there was a decline both in quantity and value. Coming to silver we find the condition reversed, production being slightly smaller but an increase in value of $335,371 being recorded through improvement in prices. As to gold, British Columbia, I am happy to say, is in the exceptional position of having increased her output while most other countries, owing to

its fixed value and generally rising costs, have fallen back. It was our lode mines which sent production ahead, the improvement amounting to $883,705. Our placer grounds, both in respect of hydraulic mining companies and the Individual miner, did not do as well, and as to the latter, to their credit be it said, the explanation is found, to a considerable degree, in the fact that those who could get away had volunteered and were fighting the battles of Canada and the Empire on a foreign field. Costs, of course, affected this class of mining seriously, but it is a notable fact that British Columbia placer mining camps were practically denuded of their young and able-bodied English-speaking manhood by the war. They were among the first to go, and they have brought honour to their country and to themselves. Before passing from this subject, it is interesting to speculate on the possibilities of the future of the Province with respect to gold mining. As I have said, despite handicaps which threatened this phase of the industry throughout the world, which were considered so serious that representative business men and mining men in the United States and elsewhere, discussed the expediency of bonusing the production of gold, British Columbia made a better showing in 1918 than in the previous year. It is to be remembered, too, that the Rossland Camp during this period was practically closed down, and it isn't necessary for me to explain to British Columbians that this is the largest single gold producing centre of our Province. The explanation, Mr. Chairman and gentlemen, is to be found in the accession to the shipping mines of the Province of the Surf Inlet property of the Belmont-Surf Inlet Mines, which made an output of 43,000 oz. And the reason that I mention this specially is to indicate the potentialities of British Columbia as a gold producer alone. When one mine is found sufficiently rich to so materially affect the Provincial production what may we not look forward to with the proper development of our resources in this respect? Should we not, I ask, with Rossland working to the extent of its capacity; with our other notable lode mines continuing production and other good prospects being developed; with our placer grounds being exploited to the fullest extent as in the past; and with labor more plentiful and costs at a more normal level—should we not, under such conditions, look forward to our Province taking a leading place on the continent as a producer of that standard of exchange for which the world, after the extremely trying ordeal through which it has passed, is very much in need in order that its economic equalibrium may be maintained?

Coal Mining.

Leaving the metalliferous branch of mining for the moment I want to refer to coal mining—one of the most important of the mining industries of the Province. I am pleased to note here that there are representatives of the collieries of British Columbia in attendance and that the programme committee has recognized the place they fill in our industrial life by providing for a discussion on questions which are of peculiar interest to them. I wish further to congratulate the collieries on the splendid effort they made during the four or more years of war to meet the urgent need which we, and the empire as a whole, had for their product. Both the operators and the miners are to be felicitated on the plucky manner in which they stuck to their guns throughout the whole period of the war. They have the satisfaction of knowing that they did their bit to the fullest extent and I for one would have them understand that their work is appreciated. And I would not have it taken that in making this reference I am considering only the coal operator and the coal miner. They occur to me in this connection, perhaps, because I hail from the coal mining city of Nanaimo, which constituency I have the honor to represent in the Provincial Legislature. After all, all mining endeavor, of whatever class, is so inter-related as to be inseparable. So if I mention coal miner and his war work, I wish also to be understood to include the metalliferous miner. For though coal was a prime essential for the successful prosecution of the war so was copper, and lead, zinc and coal—and I might go right down the list. The operator of the Province and the miner of the province, whatever you found him, did his best. There were, of course, some misunderstandings, but they were quickly righted in most instances and generally, throughout the years of conflict, the spirit of patriotic service was so manifested as to make on proud of our country and of its people.

As to the coal production of 1918 a few figures may not be amiss. The Provincial Collieries show outputs, both of coal and coke, exceeding those of the previous year; the increased output of coal being some 142,093 tons, while that of coke was 30,751 tons. As the value of coal has advanced substantially the product of our coal mines for 1918 represents about $12,794,932, an increase over 1917 of $4,310,589.

If I may be permitted I wish here to make a few statements of facts as to the policy of the Provincial Government in respect of the Mining Industry. One of my first acts as Minister of Mines was to divide the Province into six mineral survey districts under the terms of what is known as the Mineral Survey Act. Over each District was placed a competent, fully qualified mining engineer. The object of this, briefly and generally, was to bring the Government and the mining fraternity of British Columbia into closer touch one with the other. The work entrusted to these mining engineers and the powers given them are laid down in the Act to which I have referred, and it is not necessary for me to recapitulate them in detail. It is sufficient to say that they were to meet each season in person as many of the prospectors, mining men and operators of their respective districts as possible. Listen to their difficulties and their problems and assist them in reaching solutions. Examine mineral claims, prospects and mines which required roads, trails, or bridges to facilitate their development and report as to whether in their judgment the future of such properties was such as to warrant an expenditure of Government moneys to assist in such work. They also were to obtain an intimate knowledge of their districts from a mineral and geological standpoint. Personally, I believe that they have done and are doing their work well. On their recommendations the Government has expended $207,523.34 in assisting the development of the mining industry under the mineral survey and development act. Since January 1st, 1917, there have been built 98⅞ miles of mining roads; 75 5/6 miles of mining trails and there have been repairs 437¼ miles of mining roads and 420¼ miles of mining trails. This is a record which, I think we are entitled to view with some satisfaction.

The engineers to whom I have referred have accepted invitations to address this convention, and I believe that you will find what they will have to say regarding the mining conditions in their respective districts will be interesting and valuable. They have been requested to deal with two special points, namely, the particular

HON. WM. SLOAN,
Minister of Mines, British Columbia.

sections of their respective districts that offer opportunity, and the best chances of good results, especially to prospectors looking for profitable fields in which to give their attention and the particular sections of their districts that offer the most promising possibilities for mining development. In my judgement we all find a discussion of these points by men who know of what they talk, most interesting and it will be specially valuable to mining men actively interested in the advancement of the industry in British Columbia to obtain this information and also especially valuable for those with capital for investment in mining properties.

Then there is the question of the development of our iron ores and the laying of the foundation for an iron and steel industry. This, gentlemen, is a big problem. It is one that might easily be made the exclusive subject of an address. I am not going to attempt to go into it exhaustively. When I assumed office it was with a conviction of the importance of this matter and an ambition to do something that would give the Province a start. How to begin was the question. It seemed to me that the first step was to secure ample data as to our resources and the work was instituted and still is in progress. I next recommended that the Government offer a bounty on the production of pig-iron in the Province and this was done. An Act now is on the statutes providing a bounty of $3 a ton on pig iron manufactured in British Columbia from local ore and $1.50 for pig-iron manufactured in the Province from foreign ore. My attention having been drawn to the possibility of overcoming the difficulties existing in the smelting of our magnetite ores without the haematite for fluxing purposes by means of the electro-smelting method, I decided to have an expert make a report on this phase of the question. Accordingly, Dr. Alfred Stansfield, an acknowledged authority on this continent on the question, was given a commission to investigate and submit a report on the feasibility of treating British Columbia iron ores by the electro smelting process. His report has been received and was laid before the Provincial Legislature at the session now in progress. He finds that the treatment of our ores by electric smelting is not only feasible but practical. The only difficulty he finds is in the expense of electric power. That must be overcome in order, if we are to treat the iron ores of this province in this way, that British Columbia pig iron may be produced at such cost as will enable it to take its place successfully in the markets of the world. And now I come to our most recent declaration of policy on this question. There are at present two firms possessing small smelters close to Vancouver whose representatives came to me recently and said, in effect, "If the Government will guarantee us a supply of magnetite ore at a certain rate for a specified period, we are prepared to make necessary changes in our plants to put the electro-smelting process of these ores to a practical test." After consideration the Government agreed to this, and the result is the introduction of legislation at the present session giving the Minister of Mines power to take ore from iron properties which are lying idle for such experiments, the owners, of course, to be recompensed. In leaving this subject I wish only to add that the Government is sincere in its desire to promote this industry, that it is fully alive to its importance, and while it will continue to offer every encouragement to those manifesting a desire to assist in launching such enterprise. I am hopeful that, as in Nova Scotia, where one of Canada's premier industries grew from a small forge-shop in a trifle over sixty years, one or both of the small plants to which I have referred will prove to be the basis of the industry which we are all so anxious to see flourishing in this province.

The Future.

The future, Mr. Chairman and gentlemen, is bright. We are now busy making preparation for an assured season of pronounced activity. Keeping the conditions in mind it is gratifying to find in our province that the largest companies are pursuing the policy of keeping their organizations as well staffed as possible by undertaking development work, improvements, additions to plant in order that their men may be kept busy and their industrial machinery prepared for the opening of the reconstruction period. The tendency of the future is and will be towards closer co-operation between employer and employee.

The development of this policy to the fullest extent, in my opinion, will brush away many industrial troubles and lead to amity, prosperity, and mutual goodwill in all industrial centres.

As far as the Government of this Province, of which I have the honor to be a member, is concerned, I have no hesitancy in saying that, while it will use all its influence towards the preservation of these good relations, it realizes the importance also, and in fact the necessity if our resources are to be developed, of pursuing such a course as will assure Capital a legitimate and fair return on investments which must necessarily be made in the opening up of our undoubted mineral resources.

If this spirit is engendered now and if we all face the present with tolerance and in the united determina-

tion to bridge the gap the reward will come as surely as the sun will rise tomorrow. And when the nations turn their eyes and thoughts from the tremendous and deadly struggle into which they have been plunged and direct attention to the reconstruction of all that has been destroyed by the scourge of war. This change cannot be much longer delayed. Soon the world will be plunged, almost as feverishly and as largely, into the work of re-building as it did into the task of defeating that evil which the Kaiser's Germany represented. And then will come the demand for everything into which the metals of our mine goes. There will be a good market, a steady market, and what is particularly gratifying, our product will go, not into implements of destruction, but into articles for the acceleration of peaceful pursuits—the advance of civilization. There will be plenty of work for all our mines and smelters, if, I may venture on a further prophesy, will be figuring on means of increasing their productivity.

I wish again, Mr. Chairman and gentlemen, to thank you for the opportunity given me of addressing you. I trust that you will have a very pleasant and profitable time in the course of this convention. It seems to me that it cannot but be of great benefit to the mining industry of this province as well as to the entire Pacific Coast.

Once again, on behalf of the Government of the Province of British Columbia, I extend a cordial welcome to our visitors, and more especially to those visitors from across the line. Mr. Chairman, there is no line. We on this continent have lived in peace and harmony for over 100 years. In the great Conflict, which has just been so triumphantly concluded, the sons of the United States and of Canada, your sons and our sons, have mingled their blood on the field of Flanders in the fight for common freedom. We have been cousins in the past, but now and for the future we are brothers.

Mr. Chairman, I have pleasure in formally declaring this convention open.

COL. LEONARD AT THE Y. M. C. A. LUNCHEON.

At noon there was a complimentary luncheon under the auspices of the National Council of Y.M.C.A. Industrial Department, the chief speaker being Lieutenant-Colonel R. W. Leonard, St. Catharines, Ont., President of the Coniages Reduction Company, and President of the Canadian Institute of Engineers. Colonel Leonard in a brief address explained that he was on the coast on a holiday when approached to say something as to the benefit of Y.M.C.A. industrial work to the Convention delegates; he, therefore, was not present as the official representative of the Canadian Institute of Engineers, but was sure that he was conveying the sentiments of the members of that organization when he extended their greetings and their best wishes for the success of the Convention. As to Y.M.C.A. work, there were no terms too emphatic in its commendation. He had seen it in operation overseas, and the only criticism ever heard was that the Y.M.C.A. bases were all at the front, and few were to be found very far back from the line. Experience gained in Eastern Canada in connection with industrial concerns was that the Y.M.C.A. was a great help in providing means of education, of entertainment and other profitable lines of occupations for the workers. He had no hesitation in recommending employers of large bodies of men to permit the co-operation of the Y.M.C.A. Industrial Department for the maintenance of good relationship between management and men and for the creation in industrial centres of a general feeling of contentment and happiness.

In the afternoon the chair was taken by Dean Henry Landes of the University of Washington, who filled it very acceptably. This session was featured by a series of addresses by the mining engineers of the Province of British Columbia. This Government staff of technically qualified men has a membership of seven at the head of which is Mr. William Fleet Robertson, Provincial Minerologist. The other six preside over the mineral survey districts into which the province has been divided under the terms of the Mineral Survey and Development Act. Each of these engineers had been asked to prepare a paper on the mineral resources of his particular district bearing in mind two specific points, namely: areas in which good results might be expected from prospecting endeavors and areas which, in his judgment might be expected to furnish good returns on invested capital. As these are two important matters, and as the information expected is of great importance to the prospectors and to the intending investors the addresses of the engineers were looked forward to with much interest, and the hall was crowded when they were announced.

Mr. Fleet Robertson was first called, but confined his remarks to the statement that the estimated value of the mineral production of British Columbia for 1918, as contained in the official bulletin entitled "Preliminary Review and Estimate of Mineral Production, 1918" was well within the facts. This showed that the 1918 production reached the total value of $41,083,093. Mr. Robertson was glad to say that this figure was more than within the mark and that when final returns were available it would be increased to a slight extent. He excused himself from going further into the matter of the mineral resources of the province on the ground that the engineers who were to follow were more closely and directly in touch with conditions within their respective districts.

THE NORTH WESTERN MINERAL SURVEY DISTRICT, B.C.

By G. A. CLOTHIER.

Mr. George A. Clothier, Prince Rupert, engineer of the North-West Mineral Survey, Number 1, then was introduced. His address follows:

A year and a half ago the Provincial Government divided the Province into six Mineral Survey Districts and placed a qualified Mining Engineer over each District.

I was appointed for North Western District No. 1, which, as the name indicates, includes all that North-Western portion of the province extending from Seymour Inlet, north to the Northern boundary of the province, a distance of about 600 miles. It varies in width, exclusive of the islands, of from 100 miles along the G. T. P. to the full width of the Province in the North, where it includes the Liaid Mining Division.

It contains many distinctly favorable features and advantages, both geographically and geologically, which are probably not appreciated by the prospector and mining people.

Of the 600 miles in length there are about 300 miles of direct coast line, the remainder consisting of that portion lying behind the Alaska strip, with the exception of the Rainy Hollow section lying west of the Lynn Canal and accessible by waggon road from Haines.

The Coast Range consisting of grano-diorite, extends the full length of the district and is bordered on each side by the sedimentary rocks through which it has intruded.

For convenience in description of the prospecting areas the District may be divided into three parallel zones or belts, viz.: the main, granite, coast range, which varies in width from 50-100 miles; the Western Contact Zone, extending practically from the coast line westward and including all the inshore islands and those of the Queen Charlotte Group further West. In my district the Western contact belt therefore extends from the head of Vancouver Island north to Portland Inlet which forms the Southern boundary of the Alaska strip, and also an area in the extreme north-west corner known as the Rainy Hollow Section. The third is the Eastern Contact Zone, extending roughly from Terrace on the G.T.P. north to the Yukon-B.C. boundary line, a distance of between 400 and 500 miles, the Kitsumkalum and Lakelai Valleys probably marking the immediate contact of the granite and interior formations.

Taking the first mentioned belt, the granite coast range, its importance from a prospecting standpoint is exemplified by such showings as the magnetite deposits on Seymour and other inlets in the Bella Coola Mining Division; the quartz veins of the Belmont, Surf Inlet Mines Co. on Princess Royal Island; the Drum Lummon property on Douglas Channel; the immense pyrite deposits on the Estall River; the Outsider and Maple Bay groups at Maple Bay on Portland Canal; the Georgia River Mining Co.'s showings in Portland Canal, each representing a different class of ore deposit withing the granite, and as such of special interest to the intelligent prospector.

The Belmont Surf Inlet.

The Belmont, Surf Inlet, ore consists of a quartz vein carrying pyrite and chalcopyrite with gold and silver, averaging in all values about $12.00 per ton, and in width 14th. or more, recent work showing an increase in vein width over the upper and older workings.

The vein has been formed in a sheared belt in the granite, the shearing action providing the channel through which the silica and mineral bearing waters have circulated and deposited their loads, in the form of a quartz vein. Prospectors should therefore note any signs of movement in the granite.

The property is equipped with an up-to-date plant, in every way. The Concentrator is of 300-ton daily capacity, using both water concentration and flotation the ratio of concentration is 10-12 into one, and the recovery very satisfactory.

The company has man an enviable first year's production of approximately a million dollars, mainly gold, but with some silver and about a half million lbs. of copper. Quartz veins in the granite seem to pay pretty well.

The Drum Lummon represents a different type of deposit in that it is a replacement vein following along an acidic dyke, which has formed the necessary channel for circulating waters. These replacements of the granite in quartz vary from a foot to ten feet in width, and carry varying amounts of the high grade copper sulphides, corellite and bornite, with chalcopyrite. The equipment consists of a small compressor and a recently installed mill of the Gibson type, with which experiments will be taken on in the Spring.

The extensive pyrite deposits on the Ecstall river represents still a different type, occurring in a wide belt of sedimentaries enclosed in the granite.

The Maple Bay deposits are quartz, mineralized with pyrite and chalcopyrite, and seemingly are filled fissures in the granite.

The Outsider group shipped several thousand tons of ore some years ago to the Crofton Smelter, returns from which show an average of 56 lbs., or 2.8 per cent copper per ton. It has again been under development during the past year with very encouraging results, showing a big tonnage of concentrating ore which I judge would respond well to flotation treatment.

From the above samples of properties which have been found in the granite, I would think that this zone would be well worth the prospector's attention. It is the cheapest and most accessible area to prospect that I know of. Fishing tackle and a gun will furnish 75 per cent of a prospector's grub and there are thousands of miles of bays, inlets and canals, curving into the mainland, providing not only prospecting routes, but assuring unequalled transportation facilities for lower grade ores than could otherwise be handled.

Opportunities for Prospectors.

It has never been systematically prospected, though there have been hundreds of claims staked by fishermen, hand-loggers and trappers; if there is a real prospector present I would ask him what the general run of loggers or trappers know about mineral. What this Section and in fact the Province needs more than anything right now is prospectors—what I am.

I might add that there are a number of promising looking prospects requiring a little money to try out.

Taking up then, the second, or Western Contact Zone, which includes all the islands, the Queen Charlotte and those near the Mainland, we have practically the same prospecting conditions, but a different formation. This is composed of sedimentaries, altered more or less near the granite, and intruded by many spurs, and isolated masses from the main granite range, as well as cut by many dykes of all kinds of igneous rocks, all tending to produce conditions exceptionally conducive to the circulation of mineral bearing solutions and ore deposition.

The Ikedo Mines on Morseby Island of the Queen Charlotte Group has shipepd for several years producing several thousand tons of high grade chalcopyrite ore.

The South-Eastern, on Graham Island, has been under development for the past year with results that warrant further extensive investigation. Several other properties are also being explored by mining men.

There are good and sufficient reasons why the oil showings on the Islands should receive a thorough investigation, something they have never had yet.

The islands near the coast have never had any amount of real prospecting.

The third belt, on the Eastern Contact Zone extending as stated from the G.T.P. north to the Yukon-B.C. boundary line, a length of 400-500 miles. This zone has been opened up principally at the head of Portland Canal and Observatory Inlet or Alice Arm, and I have no hesitation in saying that if the balance of the zone equals the known portion, it will prove the greatest mining area on the continent.

This portion of the District lacks the natural transportation facilities of the Coast Section, it being only accessible in spots, but they have proved and are still proving to be *some* spots.

The furthest south available point on it, in my District, is on the G.T.P. where the granite range is about 100 miles wide. Some little prospecting has been done in this Section resulting in some fair showings on the Zymoetz River, Thornhill Mountain, and around Kitsumkalum Lake. I noticed a fine specimen of free gold in the exhibit from Thornhill Mountain, just across the Skeena River from Terrace.

The only place on the belt on tidewater is at the heads of the Portland Canal and Observatory Inlet.

The Granby Plant at Anyox.

The operations of the Granby Consolidated Mining, Smelting and Power Co. at Anyox have of course provided the bulk of the output of the District. The production this year in copper being about 31,000,000 as against 28,000,000 lbs. last year. The company has very extensive additions and improvements under way, notably the installation of a coke and by-products plant costing about two millions of dollars, and which, under normal conditions would have been completed early this spring.

The company has had a Pilot Mill, of 100 tons per day capacity in operation for over a year, experimenting with the concentration by flotation, of its own ores, both from Hidden Creek and its Alaska properties. The flotation of the silicious ores has presented no difficulties, and I understand that some measure of success has been obtained in the selective flotation of the heavy sulphide ores. This company has been a boon to mining on the coast, for its engineers are always in the field for ores suitable for its purposes. They have done a great amount of exploratory work principally by diamond drilling and at all times has been a God-send to the prospector and small operator when supplies were necessary.

The Dolly Varden.

In the Alice Arm Section a great deal of development work has been done principally by the Dolly Varden Mines Co., whose holdings lie about 19 miles from tidewater up the Kilsault River, this property and the Wolf Group belonging to the same company, and lying about two miles further up on the river on the east side, has an immense tonnage of commercial ore, estimated at a half million tons, proven by diamond drilling. The average ore will make a fine grade for milling purposes, and there are several thousands of tons of high grade shiping ore ready to be mined.

The company has been engaged during the past two summer seasons in constructing a railroad from tidewater to the mine. This work has been delayed for different reasons, but it is hoped that all difficulties will be early adjusted in order that the district dependent on the operation of the railroad will have the opportunity for activity which transportation will give. A very complete report on this section was made by Professor Turnbull and published in the Minister of Mines Report of 1916. I went over the Section again during the past season, and as the yearly report will be published shortly, think it unnecessary for me to go into detailed description of the different properties. I was very favourably impressed with the whole section, and I look to see at least eight properties other than the Dolly Varden quickly develop into shipping properties as soon as rail transportation is assured. In fact, I have never before seen, in such a comparatively small area, so many strong, well defined veins and no section where there are better chances for the mining investor. From a prospector's view the Kitsault River has been fairly well staked on both sides, but I believe there is still plenty of vacant ground higher up. There is one good feature of this particular section, and that is that there has been little or no blanketting of the country by individuals staking claims, and therefore there are more individual owners and more assessment work, and good intelligent work, too, in the majority of cases, than in most sections, all going to show that where this Eastern belt is intelligently prospected and good horse-sense used in development work, it will give satisfactory results.

The rock formation which has, so far, been most prolific of ore-bodies, is the greenstones or andesites, locally known as the Silver belt, since all the silver showings occur in it. The general vein filling is a pyritized quartz, or a pyritized silicified greenstone carrying the metallic minerals, native silver, the silver sulphides, argentite and ruby silver, and in places, galena and zinc. Such deposits or veins are shown in the Dolly Varden; the North Star adjoining the Dolly Varden on the North and possibly containing the continuation, down the hill of the Dolly Varden vein; the Toric Group; the Tiger Group; the Musketeer; the Wolf; the Second Thought; the Moose; Last Chance; Silver Horde, and other groups, all with big, well-defined veins of from 5 ft. to 30 ft. in width and the majority of them showing in places, high grade silver values and well worthy of further development.

Around the borders of these greenstones where in contact with the slates are sedimentaries, or near dykes intruding the slates, are found the copper, in the form of chalcopyrite, deposits. In this class of ore deposits there are the Homestake Group, at the head of Kitsault River, and several individual claims above it; the Vanguard Group, south of the Homestake, and on which there is a fine surface showing of calcopyrite about 6 ft. in width; the Wild Cat, on which shipping ore is exposed; and several other groups, all on the west side of the Kitsault River.

Further south, or nearer Alice Arm, the rock formation changes to a slate in which occurs the small high grade quart zsilver veins of the La Rose, the Black Bear, or Roundry property, each of which made small shipments of high grade during the past season. A trail, 2 miles long was built with the assistance of the Mines Department from the railroad to the La Rose Mine. There are also other promising looking properties such as the Independent Group in this slate formation which are under development by the owners.

Up the Reliance River, which flows into the head of Alice Arm, the slate formation of the lower Kitsault River prevails, and has the same small, high grade, quartz veins as noted on the La Rose and Black Bear properties.

So far as prospected yet the most encouraging showings are pretty well up the river, from 10 to 16 miles from tidewater. Considerable prospecting work has been done on the United Metals and the Seven Bell groups on the west side of the river, and on each of which there are several small high grade, silver-bearing veins. No depth has been obtained on either proprty, but there is every reason to believe, from the number of exposures of shippig grade ore, that they will become producers of a small tonnage of high grade ore. The Monarch groups on the east side of the river also make a fine showing, several other properties equally as promising might be described, but that is not the object of this paper. There is a fair trial from the beach to the head of the river. About four miles from Alice Arm on McGrath Mt. are several fine showings of zinc ore, notably that of the Standard group which, where an open cut exposes apparently a width of quartz of 60 ft. carrying dissiminated blend, which also occupies in brushes and hands of up to 2 ft. in thickness. The continuity of the vein has not been determined, but it is a remarkable out cropping of zinc ore. Further up the hill the Silver Band group also has a very promising showing.

Taking the out-croppings, the very encouraging results of any development, and the proven properties, into consideration, one cannot help becoming enthused with the possibilities of such a section. If the prospector could be made to understand the difference between living in luxury the rest of his life by getting, say $25,000 for his property, instead of plugging along and dying poor by wanting $100,000, there would be little difficulty in financing the promising looking prospects I look for this section to make one of the permanent mining camps of the province.

Bear River.

Further north this eastern contact belt is again being prospected and developed in that section of the District at the head of Portland Canal, up the Bear and Salmon River Valleys. There was a considerable boom on the Bear River Valley in 1910-1911, in which a lot of experience was gained by a lot of people. The Section has been more or less idle ever since, and there is no possibility of the revival of the mining industries, except absolutely on the merits of the properties.

Geologically the section is similar to Alice Arm and Angot, consisting of areas of sedimentaries intruded by dykes of all kinds, and areas of igneous rocks, principally greenstones, which appear, so far as development has reached, to be the most favourable formation for ore bodies. The remarkable discoveries up the Salmon River have done much to restore the confidence of the old timers, who have stayed with the camp, and turn the attention of the mining world to this once over-looked camp. Above the town of Stewart, up the Bear River Valley, work has been continued on several properties with results that justify the faith of the owners in their properties. It has been a hard and discouraging time, for they knew that only time or exceptional merit in a property could start anything. However, there are several properties that have the ear marks of developing into producers.

On Glacier Creek there are several good showings, while the copper showings at the head of the Bear River are improving steadily with each year's work. I look for gradual resumption of development in some of the older properties which were exploited in the earlier days. It has been the history of all camps that such properties usually receive investigation later. This valley will some day be the outlet for all that portion of the province lying north of Portland Canal and back of the Alaska Straits.

Salmon River.

The Salmon River has had the greatest attention, due to the remarkable development of the property of the Salmon-Bear River Mining Co., better locally known as the "Bush" mine. The property was worked for a couple of years by New York interests, who failed to develop any commercial ore. The present owners came along, and with practically no work opened up a high grade shoot of ore lying in the mineralized zone of actural greenstones which the former people had exploited for a couple of years.

Estimating from average samples taken all along the present working tunnel, for the length exposed along the ore shoot and the depth of backs from the surface, give a rather startling gross value of possible ore. The company constructed a sleigh road last summer from the mine to the beach, a distance of 16 miles, which has been utilized this winter for hauling down ore. Some 200 tons have been shipped, and about 450 tons have been hauled to the beach and will be shipped as soon as possible, and it is expected that 300 or 400 tons more can be taken out this winter. It is estimated that this ore will run well over $200 per ton, which will give a minimum production of $160,000 for 800 tons, in say 6 months, from a property as yet being worked by hand. Truly a wonderful showing of gold-silver ore. The very fact that so much work was done by thoroughly competent mining men without results, and the disclosure of such a remarkable shoot of ore, with other shoots only partially opened up, gives every property or showing in that section the possibility of developing into a winner. Two other properties above this one, the Mineral Hill group and the Big Missouri, have surface showings practically identical, with that of the Salmon Bear River property. The Big Missouri heretofore has been considered an immense deposit of complex ore requiring unlimited capital to develop and treat, but the uncovering of high grade ore apart from the old known deposit has placed the property on a different basis entirely. I understand that the present bondholders, D. D. Mann and associates, intend diamond drilling the new find the coming season.

Should this prove satisfactory it will mean the opening up of a section of country in the upper Salmon River Valley, for which rail transportation will be provided, and which will, I believe, become one of the great mineral producing areas of the province. Such other properties as the Yellowstone and 49 groups above the Big Missouri, the Pay Pool, the Indian Mines Co.'s property, the International group and several others, give good solid reasons for believing that the future of the section is assured with the outlay of the necessary capital to develop it. The Sleigh Road to the Salmon Bear River property will be converted into a waggon road this coming summer, and will probably be extended as a winter road for 5 or 6 miles further up the valley, on a route selected to serve the greatest number of properties. When completed this road will provide adequate facilities for getting in any machinery, etc., necessary for development work on any scale.

From a prospecting standpoint the one unfortunate feature in this and the Bear River Valley Sections is the tendency of a few individuals to stake all the country from year to year to the exclusion of others who might do some real prospecting. Several new finds were made last summer, and work done on older showings has proven very satisfactory.

Considering everything, the Portland Canal and the Alice Arm Sections give every opportunity for prospecting, and I know of no other country where an investor can get a better real run for his money than these mineral areas.

The two sections represent a length on the Eastern Contact Zone of possibly a hundred miles. Should the balance of the zone north and south prospect with results equal to this portion, the statement made a moment ago that this zone will make the biggest mineral producer in the province seems very reasonable, and looking into the future the possibilities of rail transportation, along the eastern flank of the coast range from Iskut River South to the outlet to the sea by the Bear River valley, may not be so very remote at that.

There has been some little activity in mining up the Stikine and Iskut rivers, but the navigation of these rivers has been the handicap to the prospecting of these sections. From reliable information from Dominion Public Works officials, I believe these rivers could be made navigable for six months in the year for light draught

river boats. I went up the Iskut a year ago, but unfortunately ran into a snowstorm, and was able to see only a portion of the country along the river. I expect to make a trip this year from the Iskut south along the east of the coast range to the Bear River valley.

Of the country at the head of the Stikine and the Dease Lake section I have no knowledge except reports by men who have operated in there, and who are very optimistic. This section I hope to include in my work for the coming year.

Further north the same eastern contact zone is again found in the Atkin Lake section reached from Skagway by the White Pass R.R. to Carcross, where the lake steamer loads for Atkin. This section has produced many thousands of dollars in placer gold, and from my observations this year will, I judge, produce for many years to come. Lode mining has always been neglected for placer, and I was surprised at the small amount of prospecting that has been done. It is probably one of the finest sections in the province during the summer months. Atlin Lode being 2,200 elevation, the surrounding hills are comparatively low, with little or no timber except along the lakes and in the creek gulches, therefore an ideal country to prospect so far as weather and other conditions are concerned.

The only properties under operation, other than the placer, were the Engineer and the Lacediere Group. I visited several showings all about the same characteristics, quartz veins lying in the sedimentary rock formation, which is the prevalent formation of the section. I also went over the Venus and Venus extension groups just across the B.C. Boundary in the Yukon Territory.

The Engineer Mine.

The Engineer Mines is the most important property in that section, and has been developed to that stage where a larger plant is necessary. I believe the owner, the late Capt. Alexander, who went down on the Sophia, was on his way out to complete negotiations for the sale of the property. It is a wonderful showing of Bonanza ore and when put on a good working basis should make the largest gold producer in the province. 600 lbs. of ore taken out in ordinary development work from the drifts from the shaft, produced 24 lbs. of gold. Comparatively little work has been done on surrounding properties, no doubt because of the prohibitive cost of everything pertaining to mining, and especially there, where incoming freight costs from $50 to $60 per ton. The White Pass Railroad were giving a rate of $8.25 per ton in car lots from Atlin to Vancouver or Tacoma, showing that the freight rates on ore are not excessive.

There is an immense area of accessible country, practically unprospected except along the lake shores, from the Yukon-B.C. boundary line, south of Take Inlet, along this Eastern zone, which should be as favourable a section for exploration as any in British Columbia.

This country was practically depleted of men during the war, but I have no doubt that with the return of so many whose training has fitted them for just such a life, that there will be quite a rush to the north again.

There are many exposures of quartz which have had only a small amount of work done on them, and which justify considerable exploration, so that there are opportunities for the investor in this section.

In conclusion, I would like to give you some idea of the importance, production and progress of this North Western District during the past four years. In 1914 the total output was..... In 1917 this had increased to $..... and in 1918 was $..... an increase of $..... over 1914 and $..... over last year. The whole due mainly to the output of the Granby Cons. Co. The main feature, however, is the fact that last year there was a new shipper producing nearly a million dollars and several others, the Dolly Varden, the Salmon, Bear River Mining Co., and the Engineer Mines, brought up to the shiping stage, and which will probably in a year's time, increase the output while coming along are other properties which are being developed to the shipping stage, and lastly, are the prospects that require the money and are waiting for your investigation.

I trust the vocational training of the best of the returned men will be along the line of the prospector for this province has got to have them.

Mr. John D. Gallaway, Engineer of the North-Eastern Mineral Survey District then read the following paper:

NORTH EASTERN MINERAL SURVEY DISTRICT.

By JOHN D. GALLAWAY.

The object of this paper is to present briefly some information regarding that vast expanse of territory now known as the North-eastern Mineral Survey District. In particular, I wish to point out, first, partly known and prospected mineral areas where claims are new held which are worthy of and waiting for further development; and second, those areas which at present are unprospected but which may be considered as promising fields for prospecting.

To begin with I am going to give you an outline of the geographic features of the district and a brief review of its mining history.

The North-eastern Mineral Survey District embraces four mining Divisions — namely, Omineca, Cariboo, Quesnel, and Peace River — with an area of 100,000 square miles. It occupies a large part of the northern portion of B.C. its western boundary being roughly, 100 miles from the Coast, its northern and southern boundaries being about 200 miles from the respective Provincial boundaries, and its eastern boundary being the British Columbia — Alberta Boundary — line.

The northern, western and southern boundaries of this district are the arbitrary boundary-lines of the Mining Divisions, but these, where practicable, always follow the watersheds of the country. The western boundary is well marked, folowing, as it does, the divide of the Coast mountains. The southern boundary extends from the Coast mountains easterly across the Fraser plateau, following a much less definitely marked watershed to the Rocky mountains, where the line crosses obliquely the axis of the mountains. The northern boundary is country which is virtually unexplored, the Liard Mining Division.

This district is a part of the Province frequently referred to as "Northern British Columbia" all of it lying north of latitude 52 degrees, and extending up to latitude 58 degrees. A large part of the district is as yet very little known and many sections are hardly explored.

The North-eastern Mineral Division covers such an immense area that its topography embraces many widely different types. An almost infinite variety of mountain shapes and reliefs can be seen, giving way in places to great expanses of plateau areas. Lakes are numerous and many large rivers ars included in the district.

In a general way this district consists of a section from the divides of two systems of mountains, with a plateau area — including mountains — lying between.

The Peace River Division is not included in this consideration, as it lies to the east of the Rockies system, and most of it belongs geographically and topographically to the Great Plains of the North-west.

Summary of Mining History.

I shall now summarize briefly the history of mining in the North-eastern District commencing with Placer Mining and then Lode Mining.

Mining in B. C. began with the discovery of gold in the Cariboo District in the early sixties, and for some time this was the only important mining being done in the Province. These placer operations centred around the old town of Barkerville, where a number of creeks yielded phenomenally rich pay. The placer production of the Cariboo District reached a maximum about 1863, amounting to about 4 million; since that time the annual output has gradually decreased, although fluctuating up and down, to about $200,000 in 1917.

As the rich diggings were worked out many expensive plants have been put in to handle the large quantities of low grade ground left behind by the old miners, but in the majority of cases these enterprises have been unsuccessful due to inadequate preliminary testing of the ground and lack of proper engineering skill. In some cases where the engineering was all that could be desired the ground proved too low grade to work at a profit. Many low-grade areas probably could be worked hydraulically but water is not available unless at a prohibitive cost of installation. Dredging may yet be used to recover the gold in some of the areas.

In the Manson section of the Omineca Division placer mining has been carried on intermittently since 1864 but has never been as important as in the Cariboo District. This area is still remote from transportation and nothing would reawaken interest, which is now nearly dormant, like a discovery of some new rich creek.

Prospecting for lode gold, silver, copper and lead commenced about 1902 in the western end of the North-eastern District, in the territory contiguous to the Skeena, Bulkley, Telkwa and Zymoetz rivers. In 1909 and 1910 silver-lead deposits were discovered in the vicinity of Hazelton, and a little later copper deposits in the Rocher de Boule mountains were located. Comparatively, little development was done on these numerous claims, beyond annual assesssment work until the completion of the Grand Trunk Pacific Railway was well within sight. In 1913 the railway was finished to Hazelton and shipments commenced from the Silver Standard mine. In october, 1914, the gap between Hazelton and Fort George was finished, and the new transcontinental railway became an occomplished fact.

Rocher de Boule.

In 1915 and 1916 there was considerable activity in the Hazelton and Telkwa sections but the high cost of supplies and scarcity of labour in the two last years have retarded development. The biggest producer in the District has been the Rocher de Boule mine which from 1915 to 1918 made an output of roughly 40,000 tons of ore worth nearly 1½ millions of dollars. About 90% of the value in this ore is in copper, the other 10% being in gold and silver in nearly equal proportions.

This property is well equipped with a 4½ mile tramway system hydro-electric power plant, commodious camp buildings, all necessary machinery, etc. It has been developed by tunnelling to a depth of several hundred feet. All this ore production so far has been shipped straight as taken from the mine without concentration or sorting. On one vein considerable tonnage of milling ore has been developed.

The mine was closed down in the fall of 1918, the reason given being: "It was thought best to suspend operations until such time as conditions became normal again."

The Silver Standard.

The Silver Standard situated five miles from Hazelton is a silver-lead-zinc property which has made satisfactory progress since the completion of the railway. The property is developed to a depth of 450 feet and a considerable tonnage of milling ore proven. There are a number of parallel quartz-filled fissures, four of which have been shown to be valuable veins. Mineralization is with galena, zinc blende, and gray copper, and the ore runs well in silver.

The property now is equipped with a 50-ton concentration plant designed and built by the Faust Concentration Company of Vancouver. The lead concentrate which is shipped to Trail will run about 50% lead and 150 to 200 oz., in silver. The zinc concentrate which is shipped to the United States runs about 40% zinc and 60 oz., in silver. The property is well equipped and in good shape for continued production. It is impossible in this brief outline of the North-eastern District to do more than indicate briefly the mineral types found.

In the western portion of the district, viz, the Skeena River, Hazelton and Telkwa Sections many different minerals are found. The occurrences may be broadly divided into two groups, copper-gold and silver-lead-zinc which however grade into one another.

Ore deposits carrying the following metals occur in the district:— Gold, silver, copper, lead, zinc, cobalt, molybdenite and arsenic.

In the south-eastern portion of the district i.e., in the Cariboo District, gold is the one important metal found, the production of it as yet having been almost entirely from placer mining, but with the possibility that in the future it will also be obtained from lode mining.

Physiographically the whole western part of the Northeastern iDstrict is made up of a part of the Coast mountains and the Bulkley mountains. Geologically this area is a promising field for the occurrence of minerals as it consists of old sedimentary and volcanic formations intruded by batholiths, stocks and inumerable dykes of granitic alioritic and allied igneous rocks. All these injections of plutonic rocks caused fracturing, shearing and fissuring of the older rocks while the expiring stages of batholithic activity as represented by emanations of mineral laden solutions and gases, provided the necessary minerals for the formation in suitable places in the fractured zones of valuable ore-deposits.

Areas in the North-eastern District where there are claims which offer possibilities for the investment of Capital.

Along the Skeena and Bulkley rivers and their tributaries there have been hundreds of thousands of claims staked. Many of the showings of course are not

worth putting stakes on, but scattered throughout are claims which have sufficient merit to warrant more or less development with the promise of eventually becoming productive mines. The predominant mineral types in all this area are copper-gold and silver-lead.

The sections which warrant the attention of those seeking mining properties are the Skeena River section, Hazelton section and Telkwa section.

In the Skeena River section the most important places are claims in the vicinity of Usk, at the head of Kleanza Creek and on the Zymoetz River slope, at the head of Legate Creek, on St. Croix Creek and on Fiddler Creek. The showings at the head of Kleanza Creek consist of impregnations of high grade copper ore in sheeted zones, which are however generally indefinite and irregular. The possibilities of this camp are along the lines of developing a large tonnage of low grade ore rather than in mining in a small way the seams and bunches of high grade ore.

During the last two years the prospectors owning claims have shown considerable energy in working on their claims. The showing here consists of high grade copper ore — bornite — closely associated with galena and gray copper. The present development shows several well defined veins in which bunches of high grade ore are found. Several properties in this vicinity are worthy of serious investigation.

In the Hazelton section there are a number of claims on Rocher de Boule mountain in which the veins are similar in type to those of the Rocher de Boule mine. Some of these undoubtedly are worth investigation and further development.

Near Hazelton the **American Boy property** which is at present lying idle has a number of veins very similar in type to those of the Silver Standard. It is developed by a shaft to a depth of 250 feet.

Nine-mile Mountain, 10 miles from Hazelton, has a number of silver-leads showings, the more important of which are at present under option to an Ontario syndicate. Other claims on this mountain are worth more investigation.

In the Telkwa section there are number of claims on and near the head of Driftwood Creek in the aBbine Range which have sufficiently promising showings to justify investigation. Of these the Victoria group owned by P. J. Higgins of Spokane and the Debenture group are silverlead properties, and the Harvey and McCabe properties contain high grade copper minerals. Cronin's property which has been intermittently developed for the last nine years and to which a 30-mile sleigh-road was constructed last year by the Government, is in this section.

Another area in the Babine range which is tributary to Telkwa is Dome Mountain on which a number of gold bearing quartz veins have been located but only slightly prospected.

Many claims have been staked near the headwaters of the Telkwa river and the South fork of that stream, and some of these may with further development prove valuable.

Intermittent development of claims on Hudson Bay Mountain has been carried on for some years past, and there are some possibilities here for leasers. These claims are not at a great distance from Smithers, the railway divisional point, and the side of the mountain is now served by a good sleigh road.

In the Cariboo district generally and in the Barkerville section particularly many attemps have been made in the past to mine gold-bearing quartz veins, but no succese has attended these efforts; many of the attempts were badly conceived and never had a chance to make good. Repeated failures have given the district a bad name with the result that it has been difficult to interest capital in any new properties or showings.

A few years ago E. E. Armstrong started prospecting in this section, and finally located claims on Proserpine mountain, about three miles from Barkerville. Mr. Armstrong spent a long time in tracing up indications of gold in the steam-gravels and panning the country far and wide, and now believes he has found the "mother-lode" of Proserpine mountain. It is to be hoped that his toil and optimistic faith will in the future be adequately rewarded.

Ther are number of well-defined quartz veins on these claims varying in width from 1 to 30 feet. These veins are mineralized in places with pyrite, arsenopyrite, and a little galena. The main valuable metal content is gold, the distribution of which is somewhat irregular. It would seem probable that the gold primarily was associated with the sulphides, but surface oxidation and leaching have in places scattered free gold through the quartz.

From the results of many samples taken, it is evident that at least portions of the veins would pay to work, and it is quite possible that further development would show considerable tonnages of ore which would pay to mill. The ore will have to be milled on the ground, and much further development is required before a large mill would be warranted. The possibilities for these claims are that when the veins are properly opened up they will furnish sufficient tonnage to mine and million quite a large scale, although average values may prove to be comparatively low grade. These properties warrant a thorough investigation by any company looking for gold properties.

Placer Mining.

Opportunities for small scale individual placer mining cannot be found to any great extent in the Cariboo District, although there are numerous places, especially on the Fraser River, where wages can be had by rocking, generally on bars of the streams. The easily reached rich ground is however worked out and during the last fifty years practically every creek in the Cariboo and Quesnel Mining Divisions has been tested by somebody. It is possible of course that some rich placer ground on the less known and far-away creeks still remains to be discovered — i.e., what might be called a new discovery — but this cannot be said to be a probability.

The Cariboo and Quesnel Divisions however now present opportunities for the investment of capital in large amounts for working the immense deposits of low-grade gold-bearing gravel which have not yet been touched. On Williams Creek there is an area which has been sufficiently drilled to demonstrate that it would pay nicely to work as a dredging proposition. Many of the creeks which are worked by the old-timers are virtually deserted, and on many of them ground suitable for hydraulicing is left. Of these the following might be mentioned: — Grouse, Antler, Cunningham, Harvey, Keithley and Fountain Creeks.

It is essential before undertaking any working of these deposits that proper testing of the ground be carried out in every case and thus not repeat the costly failures previously made in the Cariboo District.

Coal.

It has been known for several years that the North-eastern District contained many areas of coal-bearing formations, and at one time the probability of there soon being a number of producing coal-mines in the Division was regarded as almost a certainty. D. B. Dowling, in compiling the "Coal Resources of the World" for presentation to the International Geological Congress in 1913, credited the "Northern Interior" with a "probable reserve of 8,200,000,000 metric tons of coal. This estimate included all kinds of coal and included "seams of 1 foot and over to a depth of 4,000 feet." These hopes were based mainly on the coal-fields along the Skeena, Bulkley, Telkwa and Morice rivers, and the Groundhog field, which lies partly in the northern part of Omineca and partly in the Skeena and Stikine Divisions; from 1910 to 1912 considerable interest was shown in the Groundhog field.

It is to be regretted that these early expectations have not materialized although in the last few months a small start has been made by the Telkwa Collieries which is now producing about 40 tons of coal a day.

There is no question but that there are some areas in which commercial coal exists in fairly large tonnages, and it is quite probable that eventually some of these will be mined.

Many other conditions besides the actual existence of coal are necessary before profitable coal-émining can be established. Transportation and market are vital factors; of these the market question is perhaps the most important. Given a good coalfield and a good market, the transportation problem can be overcome.

The coal areas in the Bulkley and Skeena, which are close to the Grand Trunk Pacific Railway, where tested have unfortunately not as yet been proved to be commercially successful. A number of these have been drilled, and the conclusion arrived at from these drillings has been that none of these areas was promising enough to warrant the expenditure of opening up and equipping a coal-mine. In some instances the area of coal-bearing rocks proved to be small; in others the measures are so badly faulted, twisted, and broken as to make mining unduly expensive; in others where other features are favorable, the ash content in the coal is so high as to render it unmarketable. It must be assumed that all the coal in the Northern Interior is so uniformly high in ash as to make it unsaleable, as there are at least some areas where the average analyses show a lower ash content than in the average coal mined in the Province.

A combination of unfortunate factors has made the areas contiguous to the transcontinental railway of slight economic value, but there are other areas at some distance from the railway where such particular disadvantages do not exist. With these, however, the transportation question is the difficulty, as it is necessary that a coal-mine should ship its product by rail. The market question comes in here, as an assured market for a large tonnage of coal must be available before the expense of building branch railways to these far-removed areas can be considered. When the Grand Trunk Pacific Railway Company was unable to secure a coalfield in the immediate vicinity of its railway-line, the company was more or less forced to equip the line with locomotives using crude oil as a fuel. This oil comes from California and Peruvian oilfields, and the company hauls it from Prince Rupert as far east as Alberta. While this policy was more or less forced on the railway company, a more vigorous effort to develop other known coalfields might have been successful, and the opening of a productive coalfield would have quickened the general development of the country.

Another possible market for coal from this district is the coastwise and ocean-going ships which make Prince Rupert a port of call. Some years ago, however, the cheapness and desirability of crude oil as a fuel became evident, with the result that nearly all of the boats plying on the Coast were converted to oil-burners. Another possible market was therefore shut off and the local market in northern British Columbia is small. The owners of undeveloped coalfields had perforce, therefore, to adopt the wait-and-see policy.

During the last two years the economic changes wrought by the war have again brought coal back to its rightful place in the economic life and development of the nation. Coal on the Pacific Coast, and it may be said the world generally, is in great demand, as the high and ever-increasing cost of fuel-oil and its derivatives has caused the users of oil to consider the advisability of reverting coal as a source of energy. At the present time the balance is very much in favour of coal as compared with oil in point of cost per horse-power developed.

The coal area owned by the Prince Rupert Coal-fields is situated on the low divide between the Morice River and the South fork of the Telkwa River. It has been partially prospected and tested by two diamond drill-holes, and an estimate by a competent engineer gave a tonnage of 50 million tons of good grade bituminous coal in the field.

The area held by the Copper River Coal Company (for which the Yorkshire Guarantee and Loan Company are liquidators) is another promising field. It has not been diamond-drilled but a drill was taken in in 1914.

Both these areas are distant about 40 miles from Telkwa (in different directions) and therefore considerable expenditure would be necessary for branch railways before they could be opened up.

Another coalfield in the North-eastern District which attracted attention a few years ago is the Bowron River area about 20 miles easterly from Prince George, a divisional point on the G. T. P. Ry.

In considering the sections of the North-eastern District which are promising for prospecting due regard must be paid to the question of transportation. Many areas at the present time are so remote from transportation that it is inadvisable to prospect them as nothing could be done with mineral showings after discovery. But there are many areas within easy reach of the Grand Trunk Pacific Railway that offer promising possibilities to the prospector.

Some of these may be enumerated as follows:—The whole Babine range which as yet has only been prospected in a few places. This range is bounded on one side by the Bulkley valley down which the G. T. P. Ry runs and on the north-easterly side by the aBbine Lake. Silver-lead showings have been staked in several parts of the range, the most important property being the Cronin mine on which a considerable amount of development work has been done. On Dome mountain, one of the mountains of he range, a number of quartz veins carrying gold values have been staked but only slightly developed. These different claims show the possibilities of the area and much of the range is as yet virtually unprospected.

Prospecting outfits can be obtained at Hazelton, Telkwa and Smithers and from the main Hazelton-Telkwa wagon road, branch trails go into the Babine range.

The strip of country lying along the eastern flank of the Coast mountains and between the Telkwa river and Eutsuk Lake is perhaps the most promision portion of the whole North-eastern District for prospecting for lode minerals. In more detail, the headwaters of the Morice Rivers, and the territory contiguous to Loring, McAulay, Tahtsa, Whitesail and Eutsuk Yakes is recommended. At the present time this country is not even supplied with adequate trails, but this condition will soon be changed. Claims have already been staked near Tahtsa Lake, one of which, the **Emerald** group, has a remarkable surface showing of silver-lead ore. This property is under option to Mr. James Cronin and it is expected that important development will be started this summer. Improvement of the present transportation into this section is now under consideration by the Department of Mines.

Another area in which little or no prospecting has been done is north of the Grand Trunk Pacific Railway between the Kitwanga and Kispiox Rivers. This area consists mainly of the old complex of the Kitselas formation, and portions of the Hazelton formation, the whole thoroughly intruded by granitic and dioritic batholith stock and dykes. The older rocks are made up of sedimentary measures and volcanic rocks, most of which have been profoundly altered by regional metamorphision and in many places consist of extensive bands of schists and slates. Undoubtedly this area from its geologic formation is quite possibly the home of deposits of economically valuable minerals; and it is virtually an unknown country — a virgin field for prospecting.

Another section which is reported to be a favorable one for prospecting and in which some claims have already been staked is on the Driftwood River and Tacla Lake. This area is a long way from the railway but the lake and river system can be utilized so as to travel most of the distance by boat.

North of Hazelton the range of mountains drained by the Theguma (Salmon) River is practically unknown country. It is to be hoped that some further prospecting will soon be done in this district.

In concluding my remarks about suitable areas for prospecting, I would like to emphasize that while the mountain ranges drained by all the creeks flowing into the Skeena, Bulkley and Telkwa Rivers have been partially prospected, claims staked and properties developed, that there are still large sections which have never yet been gone over.Taking the map I refer to that country lying between Copper City and Houston.

A Promising Field.

In conclusion it may be said that the North-eastern District at the present time offers a promising field both for mining investment and as a virgin field for prospecting. During the last two years the country has been almost depleted of men with the result that prospecting has almost ceased and also that many promising surface showings have had little or nothing done on them.

It is expected that the return of many men to the country now that the war is ended will result in a general revival of prospecting. Undoubtedly many of the prospectors who enlisted will return to their old occupation, while the free, adventurous life of the prospector, with its promise of possible spectacular returns, will make a strong appeal to many returned soldiers who before the war had led indoor lives. The North-eastern Mineral District should secure a considerable number ofthese returned men who are desirous of following such a life.

This Chamber of Mines can do useful work in assisting such men who are desirous of engaging in prospecting, by intelligently advising them what districts to go to and generally in assisting them in starting out on what will be, to many of them, a new occupation.

Another useful objective of the Chamber would be to form an intermediary between small syndicates and men desirous of prospecting by making arrangements between them along the lines o fthe old 'Grub-stake' system, which did so much to develop many of our older mining camps.

As the foregoing are districts which, comparatively speaking, have been little prospected, it has been thought well to reproduce them in full. Both the North-Western and North-Eastern districts of British Columbia are very highly mineralized and, as will be noted, by the observations of the Engineers, they have great posibilities in a mining way. Mr. Clothier's report in particular when it is borne in mind that the author is a responsible Government mining engineer, might almost be termed glowing and therefore to those interested in the future of the industry in the West is highly gratifying.

Mr. R. W. Thomson.

Mr. R. W. Thomson, Engineer of the Central Mining Survey with headquarters at Kamloops referred to his district as one having a very bright future. He said that while it was the smallest in point of output it probably produced the greatest variety of mineral in comparison with any other section of the Province. He referred to the very full geological reports of the late Doctor Drysdale in reference to some particular areas; dwelt on the recent development of quartz bearing properties situated on Cadwallader Creek and gave some information regarding iron bearing areas in the neighborhood. The latter, he said, was very promising. He spoke, too, of the coal bearing areas of the Nicola-Princeton District which was being largely developed and which last year had produced something over 150,000 tons of coal. His information was that another property was to be opened up and would be in operation in the very near future. While he did not care to definitely commit himself as to which particular sections of his district were best suited for prospecting he asserted that there were large areas which had been very little explored and which he thought would, without doubt, repay investigation. There were also areas which contained properties somewhat beyond the prospect stage in development which would warrant the investment of capital.

Mr. P. B. Freeland.

Mr. Phillip B. Freeland, Grand Forks, B.C., Engineer for the Southern Mineral Survey District stated that the territory covered by district No. 4 was made up in part of mountains which are a part of the Cordillera System which, in Mexico and the United States is estimated to have produced minerals to the value of over $3,500,000 for each mile in length of these mountains. Within British Columbia, he said, the Mountains comprising this system have an approximate length of 800 miles and a breadth of 500 miles. His

district was only a small portion of this expanse, the area being aproximately 6,500 square miles, but the production for the past 22 years would give some idea of the mineral possibilities of the whole country. The production, he said, amounted to the following:

Gold	Silver	Copper
1,420,000 ozs.	6,780,000 ozs.	435,309,000 lbs.
Lead	Coal	
503,000 lbs.	209,000 tons.	

Only a few hundred tons of fluorite had been shipped up to the present time, but the size of the outcrop promised a large tonnage of this mineral. The construction of a mill for concentration of the fluorite was under way at the present time. The cromite deposits had not been thoroughly exploited and their size was unknown. After referring to the Grand Forks and Greenwood mining divisions and their production of copper from large grade ore bodies Mr. Freeland stated that these deposits have been greatly diminished in size and in some cases worked out without any further prospects being developed sufficiently to interest the companies now operating in these two divisions. This, however, did not mean that there were no more deposits to be found, but only that no surplus showings had been discovered up to the present time large enough to interest the companies operating in that locality. It was often the case that bodies of ore are entirely covered by debris and very little evidence of their presence indicated except by a small amount of carbonates. This, of course, was widely known in mining circles and a local case in point occurred at the Monarch Mine in the Phoenix Camp. Here a deposit of 100,000 tons of ore missed having an outcrop by only a few feet and was discovered by a tunnel driven to develop an ore body some distance away. This instance was quoted to show that although the copper industry is on the wane in these two divisions there are yet chances, and good ones, of discovering other deposits.

Mr. Freeland continued:

That this will take patience and effort is probable in the already well prospected localities, but there are many outlying districts that have scarcely been scratched and samples brought in from time to time by prospectors show evidence of the same geological condition that occur in the Phoenix and Greenwood Camp, and which have produced such an abundance of copper, gold and silver.

The policy of picking the ripest plums, is, of course, the most paying, but such a condition cannot last forever and the time will come when districts passed over because they had no apparent large outcrop will be again explored systematically and I hope with gratifying results. In a geological survey report on the Franklin Camp, which is situated approximately 45 miles north of Grand Forks and embraces an area of 16 square miles, the writer of which was the late Mr. C. W. Drysdale, it is stated that the Franklin contact metamorphic ores resemble those of the Phoenix most closely in character and belong to the same Chalcopyrite-Magnetite class. The Franklin occurrences has somewhat similar structural relations to that of the Elk Horn Mine in Montana. The ore bodies are in the crushed dolomote which served as a channel for the ascending solution. There are a variety of gold, silver and copper out-crop in this camp which up to the present time have not been developed to any great extent. **It is a locality that I believe is worthy of further exploration and development.**" Mr. Freeland then referred to the country commencing in the vicinity of the north end of Christina Lake and extending north between the Arrow Lakes and the North Fork of the Kettle River as far as Gallopin Mountain. This is a district which has come to the front recently and its property carry a high grade silver and lead. Further exploration, he said, is warranted on both sides of the main Kettle River and also on the west fork of the Kettle River. Here there were great old crown granted claims which would be worth looking over. These claims have lain idle for years and at the time of their exploration there were few facilities for transportation. Conditions, however, have since changed and, for this reason the speaker thought, that it might be found that some would repay development. He also suggested intensive prospecting along the route of the high power electric lines being built from Greenwood to Princeton, B. C. He pointed out also that the largest producer of gold in his district was the Osoyoos Mining Division, the load gold coming mainly from the Hedley and Similkimeen localities.

In discussing recent developments at Copper Mountain Mr. Freeland said that the highly siliceous alumina content of the Copper Mountain ores, of which there are 12,000,000 tons blocked out made concentration by oil flotation necessary. He said this locality promised to be one of the leading producers of copper in the country.

The sedimentary rocks near Princeton, Coalmont and Tulameen covered an area of approximately 50 square miles, seems of better class lignite varying in thickness were being worked at the present time. Chemical analysis showed that a small area, about 3,300 acres, near Coalmont, contains bituminous coal. This also is being worked.

Brief reference was made by Mr. Freeland to discoveries of Chromite and Platinum in his district during the war. In regard to the platinum he stated that the gravels of the Tulameen River were well known for their production of gold and platinum and that much platinum was thrown away in the early days when the price was low. "In fact," he said, "it was considered a nuisance by the placer miners because its high pacific gravity caused it to mix with the gold. A representative of the munition board sampled the rocks of the Franklin Camp and found that the pyroxenites carried some platinum." He added that indications were that Russia's present known supply of platinum would last about twelve years. After that time, unless some other large field was discovered, another supply would have to be found, which might bring British Columbia occurrences under further consideration and result in the arrangement of some system whereby the platinum and copper ores might be analyzed and paid for by the Smelters.

Concluding, Mr. Freeman said. "The encouragement of the prospectors is a subject which I believe is going to be discussed by others of this convention and I am sure it will receive the hearty support of all interested in mining. During the short time I have been resident Engineer of this District it has been a pleasure to see the keen interest taken by a great many of the prospectors in studying the formations likely to contain minerals. It is in this way that a good deal of assistance has been given. A distribution of samples of ore in the various towns has also helped.

Mr. A. G. Langley.

Mr. A. G. Langley, District Engineer of the Eastern Mineral Survey District, which includes the East and West Kootenay, next delivered a very interesting address on Metalliferous Mining in that section. He dealt very exhaustively on the subject explaining conditions thoroughly in each section from the south to the north. After describing the geology of the district he gave an outline of the principle properties producing gold, silver and copper.

The silver-lead-zinc production of the district overshadowed that of all others and was at the present time the mainstay of the metalliferous mining in this particular section of the country. Dealing with the Slocan Districts in this connection it was stated that a great deal of money had been taken out by various properties in that section. The Standard alone having paid $2,700,000 in dividends, The Rambler Cariboo $500,000, while it was estimated that the Slocan Star produced over a period of 12 years or having a net value of $1,875,372. The Payne Mine, which had been one of the largest producers of the Slocan closed down in 1904. Its discovery dated back, he said, to 1892, and it produced over 50,000 tons of silver lead ore, representing a gross value at that time of nearly $4,000,000. Dividends paid between 1897 and 1904 amounted to $1,438,000. The mill concentrate during 1903 averaged 124.0 ozs. in silver, 67.29 lead. This was given merely as an illustration of the possibilities of that part of British Columbia. Mr. Langley continued, "Among the properties which have undoubtedly made a large earning during the last year or two are the Surprise and Queen Bess. In 1916 Clarence Cunningham took over the Queen Bess which had been idle for a number of years. Large bodies of ore were soon developed and the mine has recently become one of the most important shippers in the district. The Idaho, Alamo, Sovereign, Wonderful, Van Roy and Hewitt and Wakefield have since been acquired by Mr. Cunningham. A 150 ton concentrator embodying the latest improvements in mill design has been erected recently by Mr. Cunningham at Alamo. Since the rocks of the Slocan series have been found to enclose the largest and most profitable silver lead deposits their appearance in other sections of the country are of interest and well worthy of investigation. Although I do not know of any geological survey records which show co-relation between the rocks of the central mineral belt of the Trout Lake Mining Division and those of other parts of the district it is interesting to note that the richest silver lead deposit in this region also occurred in dark carbonaceous and graphitic slates. Large tonnages of high grade ore have been extracted from the Silver Cup, Netty L. Triune and other properties. The ore is galena, blend and tetrahedrite carrying high silver value. As an example, between the years 1901 and 1905 five hundred and thirty-four tons were shipped from the Triune which ran: gold 0.9 oz.; silver 250 to 400 ozs.; lead 33 to 50 per cent."

The Sullivan Mine.

Mr. Langley dealt in detail with the Arrow Lake Mining Division, the Ainsworth district and the Kaslo district touching upon some of the chief properties of those fields. He then turned to the East Kootenay district, referring at the outset to the Cranbrook area and then taking up Kimberley area in which are the Sullivan, North Star and Stemwinder properties. Of the year it produced 30,554 tons of lead ore, 97,976 tons of zinc ore and 4,582 tons of iron pyrites. The Sullivan Mine was staked in 1895. In 1902 the Sullivan Sullivan, he says: "This property is the largest producer of lead and zinc in the Province. During last Group Mining Company erected a smelter at Marysville which closed down in 1908. In 1910 the property was acquired by the Consolidated Mining and Smelting Company and is now considered to be one of the greatest mines on the American continent. For a long time the problem of treating the complex zinc ores prevented large tonnages high in metallic content from being considered of commercial value. In 1918 a satisfactory solution of this problem was obtained and thus many millions of tons of ore previously considered of no commercial value was added to the already large reserve. According to the management by mining and treating this ore on a large scale, they will be able to produce zinc and lead at a profit on any market which exist in recent years, providing the price of labor and supplies falls with the price of these metals. The long added tunnel, which now has a length of nearly 8,000 feet is reported to be in ore and preparations are now being contemplated for extensive improvement with a view of increasing the output."

Dealing briefly with some of the properties on the north fork of Toby Creek in carrying high silver and lead value and with other properties of the Fort Steel, Windermere and Golden Mining Divisions which, he stated, had not received nearly as much attention from the prospector as sections of West Kootenay and that there were many opportunities here both for the prospector and capitalist, Mr. Langley, continued, "It is ridiculous to suppose that the East and West Kootenay have been thoroughly prospected, for such is not the case, as is quite apparent to any one who has travelled the mountains and is familiar with the nature of the country. It is still a young mining country and, providing market conditions remain favorable, we should see an increase in production during the next few years. What we need is more capital and more prospectors. There are still many properties which were successfully operated some years ago now lying idle that are no doubt worthy of careful investigation and in which ore might be developed and worked profitably under existing conditions. For such enterprises as these capital is needed and also for development of new prospects. Again, there are a number of small deposits carrying high grade ore which are not suitable for working on a large scale and which can be successfully mined by two or three men. These properties are often worked under lease and bond and in many cases substantial profits have been made.

Mr. W. M. Brewer, of the Western Mineral Survey District, when called upon, explained that the area included in his district totalled approximately 48,000 square miles in which about 3,000 square miles were taken up by the Straits of Georgia and other Straits and Inlets between the mainland and East Coast of Vancouver Island. He drew attention at the outset to the fact that within this district was the Britannia Mine, one of the most important copper mines of the British Empire, and a monument to the late G. D. Schley, of New York. The district possessed a great diversity of mineral resources, including coal, ores carrying copper and gold, iron, silver, lead, manganese and molybdenite, also limestone for cement, quick lime and flux, marble, building stone, clay, talcose, slate suitable for some of the various purposes for which talc is generally used and

an occurrence of graphite reported on Harbledown Island.

The district's production of coal from Vancouver Island during 1918 he put at 1,666,582 long tons, and the estimated production of copper for the district, nearly all of which came from the Britannia and Marble Bay Mines, at 19,470,760 pounds, of which about 18,000,000 pounds was from the Britannia. The quantity of lode gold was estimated at 5,800 ounces and of silver at 115,120 ounces. All of the precious metals were derived from the smelting of copper ores carrying low values in gold and silver.

He said that the district presented an excellent opportunity for the prospector, but asserted that the prospector must be prepared to tackle a few difficulties. He would have to be accustomed to the water, a fair boatman and know how to handle a canoe and be able to use an axe, cross-cut saw, a rifle and fishing rod. The various lakes, sounds and inlets where the several small bays afford protection and shelter in case of storm provided unsurpassed transportation facilities, as well as excellent fish food. He added: "There is an old saying amongst the coast prospectors that when the tide is out the table is spread. In other words all a man need do is to go out when the tide is low and dig clams and he will never be hungry."

He said that the most attractive sections for prospecting in his judgment were the Coast Range of mountains on the mainland and sections of the west coast of Vancouver Island. After going into the geology of the Coast Range, he referred to some first-class property in that section, dealing particularly with what he describes as the Britannia Belt. As to the rewards obtainable by prospectors, it was interesting to note that, since the original Britannia group was located in 1897 or 1898, the mining company had purchased about 350 claims, nearly all of which were staked by prospectors some years ago. The cost to the company for these purchases was about $1,000,000. The westerly side of Howe Sound, he thought, would be a favorable one for a prospector to explore. The section in the vicinity of Lough Boro Inlet, Phillips Arm, Butte Inlet, Knights Inlet and Seymour Inlet he said, was prospected to some extent about twenty years ago, and a part of the section was then one of the most active portions of the Coast district, but had been neglected since the Dorothy Morton Mine closed down. The fact that occurrences of bornite and chalcopyrite were discovered not very long ago in the mountains adjacent to Wnight's Inlet, suggested the entire section was entitled to further consideration from prospectors, especially when it was considered that an ore which was practically valueless ten years ago is today a commercial asset. "Only recently," he continued, "a prominent operator inforemd me that he expected to see the day when he could successfully mine and treat a copper ore carrying not to exceed 1 per cent in copper provided the extent of the deposit was sufficiently great."

Referring to the best places for the investment of capital in mining, Mr. Brewer mentioned Quadra Island, Texada Island, Lucky Four Group in the Cheam Range, the Big Eye Group near the head of Great Central Lake and the Alberni Mining Division and the Tarmigan Group adjoining the Big Eye. The three last mentioned groups of Mineral Claims, he said, required very large expenditures of capital to develop them, but they all had the ear-mark of promising to develop into such extensive properties as are in favor with the big operators.

Texada Island, he referred to as a promising field for investment. He spoke of the type of deposits on this Island as having been proven to maintain continuity to a considerable depth and stated that other conditions, such as transportation facilities, are as nearly ideal as it could be expected to find anywhere. Intelligent prospecting and the investment of capital also promised good rewards in several other Vancouver Island localities. He said that but little real prospecting had been done on the Island during the past fifteen years. Previous to that time there were about 200 prospectors exploring the mountains on the west coast, but many of these men about the year 1903 abandoned prospecting to stake timber claims and a large number became fairly rich by selling out. Capital was easier to secure for purchasing timber than to develop mining properties, although many of the pioneer prospectors cleaned up good stakes.

Mr. Brewer's address concluded the Monday afternoon proceedings, and in the evening Mr. T. A. Rickard delivered the paper to which reference has already been made, his subject being "Mining as an Investment."

(*Continued on Page* 242)

Employes at Trail May Buy Company's Bonds.

With reference to the recent announcement that the directors of the Consolidated Mining & Smelting Company of Canada has authorized an issue of ten-year convertible gold debenture bonds, which action has been endorsed by the shareholders, an interesting statement has been made by Mr. S. G. Blaylock, assistant general manager of the Company which is indicative of the company's attitude towards its employees. He says: "It has been decided to allow employees of two or more year standing to subscribe for these bonds without insisting on the stockholding qualifications. They may have their payments extended over a period of 10 months. The interest charged on back payments will be at the same rate as is paid on the bonds, namely, 7 per cent." It is further explained that when the list of subscriptions was closed at Toronto on February 3rd it was found that shareholders had agreed to take up the entire issue of $3,000,000, but it was decided by the management to accept subscriptions from such employees as desired to take advantage of the offer. Accordingly the list is now open at Trail for that purpose for a limited time. The bonds are issued at par in denominations of $100, $500, and $1,000, and are dated January 1st, 1919, carrying 7 per cent.

Kaslo.

An assay office is being constructed at the Rosebery-Surprise Mill, Rosebery, the old building having been destroyed by fire a few days ago, most of the contents being saved.

Charles Hendrickson, of Howser, has disposed of all his interest in the Red Cloud Mineral Claim, situated on the west slope of Lavina Mountain, one mile from Duncan River, to A. Le Blanc.

E. W. Senff and A. Le Blanc have taken over from W. F. Clarke, of Howser, all interest in the Jumbo Mineral Claim, situated on Lavina Mountain.

P. J. Sheridan, of Nelson, B.C., has given an option to the Nelson Mining and Development Company in respect of the following properties all situated in the Lardo Water Valley; Comstock, Noonday, Silver Hill, White Water, Barker, Rambler, Markwell, Spokane, March, Six Friends, and Volunteer. The utimate consideration is fixed at $60,000, to be paid in installments covering a period of four years.

Mining: An Investment, a Speculation, or a Gamble

By T. A. Rickard.

The Chairman of your Programme Committe told me that the subject allotted to me was "Mining as an Investment." I assumed that he meant the gainful use of money in mining, that is, the making of money through the exploitation of mineral deposits, not other people's pockets. However, I deem it well to start by defining the terms to be used in the present discussion, because definitions are essential to a correct understanding of any subject.

Money can be employed profitably in three ways: Investment, Speculation, Gambling. An "investment" looks to income; the use of the word assumes the comparative safety and stability of the principal. A "Speculation" looks to an increase of the principal; the use of this word suggests the minor importance of interest, income, or return on capital; it assumes not the stability, but the comparatively rapid appreciation of the principal. A "Gamble" involves a risk so large as to require the aid of luck; it ignores interest or income, it anticipates the alternative of a big winning or a total loss.

Obviously, the definition is subjective; it is based upon the expectation of the individual making the purchase. To one man the use of money for a certain purpose is an investment; to another man the same use appears to be a speculation. Similarly, one man's speculation is another man's gamble. Six years ago, Mr. Lloyd George and Lord Reading, then Sir Rufus Isaacs, were persuaded by Mr. Godfrey Isaacs, a brother of the present British Ambassador and Lord Chief Justice, to buy a block of American Marconi shares as an investment, that is, as a steady dividend payer. Three days after, Mr. Lloyd George had bought his shares, they rose so rapidly that he sold them, on the urgent advice of his broker, to whom he was disinclined to listen, because his intention was to hold the stock "as an investment." He was then Chancellor of the Exchequer, therefore he was hauled over the coals for "speculating"; he was charged with a levity of conduct unbecoming the chief of the British Treasury. He replied by saying that when he bought the shares it was his intention to hold them indefinitely, and that the sudden and surprising rise justified him in selling. In short, his "investment" had proved a "speculation." The distinction is in the mind of the purchaser. Similarly, a Boston school-teacher may buy the shares of the Great Wildcat Extended as an "investment," whereas a Wall Street broker recognizes that it is highly "speculative," and a Nevadan mining engineer knows that it is a rank "gamble." These terms are relative; they connect a crescendo of risk; even an investment has a slight element of risk; a speculation has more; a gamble, most. Sometimes a stock is bought on the expectation of a rise; it remains steady for years; it proves to be what is called a "forced" investment. The idea of expectation is implicit; human factor is never absent; we are dealing not with lexicons, but with human affairs.

The other significant word is in "Mines." A mine is an excavation in the earth's surface, from which mineral is extracted. It is not a company, nor the shares of a company owning that excavation. A flippant definition says that a mine is a hole in the ground with a liar sitting on top. A promotor is said to be a man who sells something he has not got, to somebody who does not want it or, if you prefer, a promotor tries to sell nothing for something to a man who expects something for nothing. However, these perversions of honest business do not concern us for the moment; my subject is the reasonable speculation that is based upon the legitimate exploitation of mines. Permit me to remind you that the word "Mine" was used in the language of warfare before it entered that of peaceful industry. It comes to us through the Latin "Mina," signifying an excavation to be used for killing the enemy. The original sense of the word survives in "minatory," meaning threatening. During the war we have heard more of mines in the North Sea than of Mines in Mexico, for example, and you will alow that thosee who have sailed the seven seas had to deal much with speculation concerning mines, and the floating of mines on water, reminding us of minatory performances on the stock exchanges during times of peace. Now, however, we hope soon to forget the derivation of the word, and to interpret it, not in terms of maleficient activity, but of beneficient industry.

You will note that I have chosen "speculation" in preference either to "investment" or "gambling" as being more appropriate to mining. The use of money in mining is seldom an "investment; usually what is meant to be so, affords an example of the triumph of hope over experience. I admit that certain forms of iron and coal mining on a large scale are characterized by such security, continuity, and steadiness of income as to be "investments," but the mining of the so-called base metals or of the precious metals, in which most of you are engaged, does not come within the category. In metal mining the chance of a considerable risk and of a correspondingly large gain is inherent. Some of you will demur, you will point at the Homestead, the Bunker Hill and Sullivan, or the Utah Copper as examples of an investment, as representing a type of security so safe as to be gilt edge, but I venture to say that your opinion is *ex post facto*. You are writing last year's almanac, you are wise after the event. The history of such persistently profitable mines causes you to regard them as safe, because you can retrace their history for 10, 20 or 30 years. You imagine yourself buying into such mines soon after they had undergone preliminary development, and you know that if you had done so at an early date your purchase would have proved extremely remunerative; but I submit that in the early stages of development these splendid enterprises were speculative as is suggested by the fact that these successful ones are a few survivors from the much larger number that were started at about the same time and proved disappointing. I may remind you, to make my point quite clear, that many of the famous mines of the world "broke" those who first attempted to bring them to financial success. If today you were to advise a widow to put her savings in any one of the three magnificent mines that I have instanced, you would, in my opinion, be an unwise councillor, because looking forward, not backward, for 10 or 20 years, they would represent a speculative use of the widow's savings. You might be sagacious in using your own money for such a purchase, because you could take the relatively small risk for the sake of the probably large gain, but the widow would be better advised to buy Liberty Bonds.

At this stage of my argument, I beg you not to be annoyed at my apparently over-cautious attitude; you will find that my conclusions will not depreciate the industry in which you and I alike are so deeply interested. I shall hammer my point home by one further suggestion. You would not be willing to lock up your mining stock in a safe for 5 or 10 years, as you might do with first-class bonds; ;you know that in the course of five years the fluctuations in market value are likely to be so wide as to compel you, in your judgment, either to cut a loss or take advantage of market profit. On the other hand, a mine is not a "gamble," because the risk it involves is not unreasonable; it is diminished by knowledge and experience, it is lessened by the skill you can apply both to the finding and to the treatment of the ore. A miner always needs some luck, of course, but his luck is a friendly sprite, not the grinning devil that sits by the roulette-wheel. Every business involves one or more indeterminate factors, and therefore contains an element of risk. Without risk there is no gain; but a large gain usually involves a large risk. There are people in mining, of course, that take big odds, that like a reckless bet; they are real gamblers, even if they are unaware of it; but the risks taken in legitimate mining are under some measure of control, they are met by scientific knowledge and by trained intelligence. A blend of pluck and judgment is required. You will recall a line in Bipling's poem, "The Merry Gloster": "And I took the chances they wouldn't and now they are calling it luck." That is why I insist that mining, properly conducted, is not a gamble. On the other hand, no man of experience in these matters would expect to escape all the risk. The idea of eliminating risk from mining is both contrary to the spirit of the business and false to the history of it. To understand mining—to appreciate the principles guiding legitimate and successful speculation in mines —which is my subject—you must revert to the old Cornish word for shareholders; they were called "adventurers," that is, men willing to make a venture.

Indeed, the idea of avoiding the risk in mining is a pathetic fallacy; a puerile endeavour to escape the inevitable. The attempt to find mines that would involve no risk to the capital sunk in them has tended to cripple the industry; the refusal of sundry so-called exploration companies to incur risk has stultified their operations and paralized development. And I may add that this policy has warped the judgment of some otherwise brilliant engineers. The story is told that Marcus Daly sent a mining engineer on a scouting expedition; he examined many prospects, without finding anything worth while. Daly became impatient; he slapped the engineer on the shoulder and exclaimed: "For God's sake, man, go out and spend some money." There is too much of a desire to play safe by buying mines of large blocks of proved ore, and to make money by means of an enlarged scale of operations, increased skill, or improved methods of metallurgy. The finding of ore, which is the real adventure, is relegated to the background; it is not only the chief attraction of mining, but the one that wins the greatest reward. When the ore reserves of a mine are at a low ebb, it may be the most speculatively attractive time to buy the property. There are those who say that the mining of the future will be the economic harvesting of known ore deposits of low grade, the beneficiation of masses of mineral already discovered, but heretowore regarded as too refractory for successful metallurgic treatment, that is, the utilization of the visible supply of skimmed milk instead of the finding of the metallic cream concentrated by the patient operations of nature. I doubt that; the world is still young, and but half explored, as is suggested by such discoveries as those of Nome, Cobalt, Porcupine, Tonopah, Goldfield, the United Verde Extension, the Baldwin Mines in Burma, and a host of other bonanzas during the last 20 years.

One does not need to be venerable in order to recall great changes in the philosophy in mining economics. In 1905 I published a book on this subject, in which was included a discussion upon various aspects of mining finance. Among those contributing, besides myself, were H. C. Hoover, J. H. Curle, and W. R. Ingalls. Mr. Curle, at that time the leading London authority on such matters, a man of wide travel and stalwart independence of mind, advised his countrymen to stick to gold mining as being the safest, because gold had a "fixed value." We know to-day, by unpleasant experience, that gold can so depreciate in terms of other commodities that the gold miner is placed at a decided disadvantage. Mr. Curle insisted that the only correct kind of gold mining was based upon a careful estimate of the ore in reserve, and that at least 60 per cent of the price of the mine ought to be represented by a net profit from the developed ore. He even went so far as to lay down the rule that gold mines should yield 10 per cent on their market valuation. Later he put the interest at 15 per cent. We have travelled far since then. Most of these *obiter dicta* served a purpose in their day, 15 years ago, as a means of educating the British shareholder, who is a simple-minded person, because Mr. Curle accompanied them with much straight information and trenchant criticism, but all such attempts to compress mining into a formula are a failure. They were based largely on the experience—then incomplete—of the Rand, in South Africa, where continuous beds of gold-bearing conglomerate were being exploited on the largest scale known to the modern world. These beds of "banket," as they were called, after the Boer name for almond-cake, were comparatively uniform in their gold contents, and were mined and milled so cheaply as to yield handsome profits. Their uniformity of grade and persistence in depth caused them to be regarded as a basis for "investments" of the safest kind, suitable for widows and orphans. Later experience has shown that they were neither so uniformly nor persistently rich as had been expected, the result being to turn the "investments" into "speculations" out of which a comparatively few made a great deal of money and comparatively many lost more than they could afford. The Rand proved to be the greatest gold field in the world, in extent and in yield, but I am making the point that it did not escape the vissicititudes latent in mining, and the successful effort to persuade the public that it would escape those vissicititudes led, in the end, to a tremendous and widespread loss of money, which passed from the pockets of the public to those of the promotors. Money made honestly on the Rand during the development stage, when adventurous spirits risked a total loss of their stake in order to make a big gain; but when the operators and promotors turned to this man of small means and persuaded him that the latent risks were eliminated, and that a gilt-edge investment was available to him in the stock of over-capitalized mines, they deceived him. Some of the operaors and promotors knew no better; others were advised by good engineers, and simply vicitimized the unsuspecting by unloading their holdings upon them at a handsome premium. To illustrate how the public was victimized, I can state that the market value of the shares

in the principal companies representing consolidations of groups of mines declined $203,931,610 between 1911 and 1918. That huge loss was due to ignoring the common experience, that mines become impoverished in depth, just as surely as men grow old, and also to the assumption that a 60 per cent ore reserve, that is, having 80 per cent of the market value "in sight," furnished ample security. In the attempt to introduce one or two academic factors of safety, the public was led to ignore the very essentials of the business, namely, that it involved no small risk, under the best conditions, and that the risk must be compensated by large dividends. Instead, the public accepted 8 per cent, or 7 per cent as an added freight return and failed to recognize that they held a wasting asset. During the speculative—the frankly adventurous—stage of Rand mining made money for nearly everybody engaged in it, but when the chicanery of the few was combined with the ignorance of the many into creating a false notice that the speculative phase had been transferred into one of secure investment, then it was that share-dealing on the Rand became a cause of great loss to the public and a blot on honest industry. From the moment when the change in sentiment was effected, and the fallacy was established, the mining of the gold became less profitable than the mining of the pockets of the public.

This investment idea, of minimizing risks and limiting possibilities, would soon cause mining to die for want of breath. Before a proftable outcome is assured every mining enterprise must pass through several stages of speculativeness, as surely as a child must take the chance of bumps and bruises, or measles and mumps. The biggest fortunes are made during the early stages of development; on the whole, more money is made by selling than by buying mines, simply because the final, or so-called investment, stage of a first-class mine is likely to represent an over-valuation, caused by an erroneous supposition that the essential hazard is precluded. I would even say that more money has been lost by the over-valuation of the great rich mines of the world, like the Con. Virginia, Mount Morgan, Broken Hill, and Nipissing, than in a multitude of worthless prospects. Shall men lose their money in big mines, and big men in small mines. The inference, therefore, is not to try to get rid of the essential risk—because it cannot be done—but to require a rate of profit proportionate to it. A much more intelligent policy is to engage in such mining as allows a liberal margin both ways, taking a larger risk for the sake of the larger gain, that is, to speculate with eyes wide open and not to invest with eyes half shut.

Fifteen years ago the careful sampling of ore as a means of valuing mines was becoming advanced to an art and the tendency was to place great reliance upon it, with the consequence that capitalists began to think themselves safe in buying ore. They thought to escape the essential risk by assuring themselves a return of their money, diminishing the speculative features of the business as much as possible. Exploration companies were organized in London, New York, and Boston to scout for promising mines on which to apply the newly developed methods of valuation. Most of these seekers after bonanzas were disappointed; they failed to repeat the successes of the pioneers in this type of mining finance—such as the exploration company of the Hamilton & Smith era—because they were too timid; they expected to have their money in sight when they bought a mine; they were looking for a bet on the sure thing, with all the profits of a speculation. They lacked the temperament needed for adventure and should have placed their money in a bank where at 4 per cent it would double itself in fifteen years. Many directors of these exploration companies bluffed themselves into the idea that they were bold navigators when, as a matter of fact, they were only fair weather sailors.

As I remarked at the time, "ore-reserves are not everything; expansion and development are the essence of successful mining." The big successes have been made by developing prospects into mines, not by buying blocks of ore that had been exhaustively sampled by meticulous young men. The profit to be made must depend upon the further extension of the ore; the larger the proportion of ore already proved the smaller the possibilities beyond. As Mr. Hoover pointed out, the probable depth of extension is more critical than the proportion of profit in sight. He worked out a rough rule for the Gold Mine of Western Australia, namely, the minimum extension of an ore body in depth should be not less than one half its length. He called it a "yardstick" for use in forming a judgment, but he laid stress on the need for investigating the characteristics of the individual ore body, more particularly its geologic structure and that of the district in which it lies. Such a rough and ready formula, however, would fit only the mines that are dependent on one or two large shoots; it would be of little service in the valuation of mines, depending on a series of recurring ore-shoots, as, for example, the Goldfield Consolidated, in Nevada, the Nipissing, at Cobalt, the Yoquivo in Mexico. Mr. Hoover made the shrewd observation that "the quantity of ore in reserve is a matter of management, not necessarily dependent on the size of the mine."

In 1912 Morton Webber protested against the use of formulas in mine valuation and showed that "the relative magnitude of ore reserve in any particular mine is largely a matter of administrative policy." I myself remember, when practising as a mining engineer, advising a client not to extract the ore in his mine if he hoped to sell it to advantage, as he wished to do. The extension of the ore-body was menaced by a fault. He listened to a saw-mill engineer, enlarged his mill from 20 to 40 stamps, extracted all the ore, and barely made enough profit to pay for the enlargement of the plant, leaving a hole in the ground in which several later operators have buried their good money. This was a gold mine in Idaho. Another example occurs to me: a small silver mine in Colorado; ore was only 5 ins. wide, but high grade. A careful sampling showed $150,000 worth of ore assured, which would yield a net profit of $110,000. The owners were willing to sell for that sum, half cash, and half in six months. I advised my clients not to buy, because the winzes below the adit-level showed that the vein was poor and much faulted. The history of neighboring mines was not promising as to prospects in depth. I considered the business unattractive because the risk of the known ore yielding less than the amount of profit estimated seemed to outweigh the chances of finding more ore, the subsequent story of the mine justified my opinion. On the other hand, I advised the purchase of the Camp Bird, in Colorado, for $6,000,000, when the bottom workings looked poor, and gave no promise of the ore persisting, because I believe that horizontal exploration would lead to the uncovering of more ore bodies, especially Westwood, where the rising surface gave virgin ground increasing to a height of 1,200 ft. above the adit. The mine had reserves equal to $6,118,000 gross, but the value of it lay largely in the good prospects of the further finding of rich ore,

without sinking, as the sequel proved, for the Camp Bird has produced $20,000,000 since then, although poor in depth. Please pardon these reminiscences of a time, 20 years ago, when I was a mining engineer, not a journalist; I give them because personal experience is direct evidence.

In 1911 M. H. Burnham contributed a series of articles on sundry principles underlying the finance of mining enterprises, more especially the "risk rate." He insisted rightly that the buyer of mines or of shares in mines should expect not only a bank-rate of interest on his capital, but as much more as will cover the additional risk inherent in the business of mining. If, as I suggested at that time, he bought into the Goldfields Consolidated, in Nevada, then the most productive gold mine in the world, but with a reserve of ore so small as compared with its annual production as to insure the return of only a small part of the market value, he, the sane speculator, ought to expect a dividend of 35 per cent per annum, or 31 per cent more than the four per cent bank rate, that is, the mine should be valued on the basis of a three-years' purchase. This famous mine is now in the hands of lessees; its story has been told, and you can ascertain how nearly right was my diagnosis of the position. However, it is only mentioned as an example. On the other hand, a mine like the New Modderfontein in South Africa or the Homestake in South Dakota might show a life and a standard of production justifying a low estimate of risk, thus warranting a much smaller return, say, six per cent more than the bank rate. It amounts to this, that after an engineer has examined a mine and measured its ore-reserves, he must determine the risk-rate at which his clients' capital may be used in the purchase of that particular property. This risk-rate will be based upon the past history, the present condition, and the future prospects of the mine.

The sampling of mines has been allowed to obscure the need for good judgment. It is also another phase of the attempt to make an investment out of a speculation. The ore in reserve in a mine should be regarded chiefly as an indicator of the probability of being able to find and develop more ore of the same grade. The expectation of a profitable venture should be based not upon the attraction of the known ore, but upon the chances of further intelligent search.

A so-called five per cent investment in a metal mine is an unwise use of money, because the interest is too small for the risk, whereas a 20 to 25 per cent speculation in a metal mine is sagacious, if the probable risk is compensated by the probable gain. As Mr. Hoover says, "there is an inherent speculation in mining, and it is this speculation that attracts." It attracts those that understand. It is the spirit of adventure that stimulates the best kind of mining. For instance, the controllers of the Homestake mine have spent 15 million dollars in 15 years on the Corro de Pasco; they have received their money back and 100 per cent additional thereto, equal to about seven per cent in the 15 years, and now they have proved ore sufficient to last for 20 years. This is what I call a fine adventure!

The speculative side of mining has an attractiveness that is at the bottom of the energy with which it is followed, and when you bring it to the dead level of a steady investment you will find that the man of ordinary shrewdness saves time by going straight to his broker and buying bonds or consols. This does not mean that one is justified in playing the fool and expecting miracles to happen. The risk of mining should not be increased needlessly by human abhorrency. Mining enterprises come to grief often not so much on account of the failure to attain an investment basis, but because they are not put on a business basis. Even if the occurrence of ore in nature be erratic, and mining as a consequence be hazardous, there is no justification for piling human foolishness on top of natures' vagaries.

A large part of public participation in mining is done by means of share-buying; this is a secondary and less desirable form of speculation, as compared with the ownership or part-ownership of mines by individuals, partnerships, or small syndicates. It is a legitimate means, however, of distributing risk and of applying collective capital to undertakings too burdensome for an individual or a syndicate. It produces a fluctuating ownership. In practice, whatever may be his theory, the American "investor" does not buy mining stocks to keep. Whatever he calls such holdings, he treats them as "speculations" he does not put them away for the sake of their dividend yield; he is always ready to realize upon them at an enhanced price; he buys them to sell. It has been said that the ownership in an American mining company changes, on an average, every five years. Hence the mysteries of amortization do not interest most of the people. They are looking for a quick turn-over, not a long-time investment. The individual owner of a mine rarely keeps it when it grows to a size involving a large amount of capital; he spreads the risk and gathers his winnings by disposing of the mine in a public company. Long continued private ownership of a profitable mine is rare. W. B. Bourn and his father before him have controlled the Empire mine in Grass Valley, California, for 50 years, and I may add that this mine has been worked uninterruptedly for 66 years. It has proved a real investment, although started, of course, as a speculation. I venture to say, however, that if anybody were to buy it to-day on Mr. Bourn's valuation, or on that of an equally competent appraiser, he would be compelled to take it as a "speculation," for the simple reason that the odds are largely against the Empire mine continuing to be worked profitably in the future for any such length of time as in the past.

Of well conducted mining ventures it can be said that they meet with a measure of success as large as, if not larger than, an ordinary manufacturing enterprise. I make no apology for mining, it has been—and still is—a glorious adventure for the youth of the world, for those young in spirit as well as in body. To mining we owe the exploration of the far corners of the earth and the development of it waste places. From the days of the Argonauts to that of the beach-diggers of Nome the call of adventure has caused men to go forth into the wilderness and prepare the way for the establishment of industry, for the extension of civilization, for the making of homes, which is the best fruit of human toil. If we stifle that spirit of adventure between formule, if we suppress it by maxims of an unreasoning caution, we shall shrivel a great industry into a picayune trading that will commit suicide in due course.

No; risk is the very essence of mining; it is its life, and the true miner faces the risk with the cheerful confidence of the men that make the world more spacious "in the time of great Elizabeth," of the Ar-

gonauts of the Golden Age in California, of the trappers and *coureurs du bois*, who opened up the great northwest.

Mr. H. N. Lawrie.

On reassembling on Tuesday morning Mr. S. S. Fowler, of Nelson, B.C., took the chair and called upon Mr. H. N. Lawrie, Chairman of the Oregon Bureau of Mines, Portland, Oregon, who spoke on the subject "Gold." His address was exceedingly interesting and the information he gave, coming from a man who knows what he is talking about, was very attentatively followed. In view of its importance it is reproduced in full as follows:

Government Control of Smelters.

The program next provided for an address by Mr. Sydney Norman, Editor of the Northwest Mining Truth, Spokane, on the subject "Government control of Smelters." Mr. Norman introduced his remarks by explaining that he did not wish it to be taken that he was attempting to impose his views upon any of the delegates present. He pointed out that he had addressed the International Convention at Revelstoke last year on the same subject and his remarks had been characterized as insidious and lurid. It had been added, too, that British Columbia did not need the advice of Americans to conduct their business properly. "I do not blame them I am sure," said Mr. Norman, "still I believe that it is only by the experience of others that any nation or any people can select that which is best for its own interests."

Continuing, he said, that he could not give any definite information regarding the commercial advisability of establishing any kind of a smelter on the southern coast. That would have to be decided by a thorough canvass of the ore situation. He would assume, therefore, that the necessary supply of ore is readily available and that location of a smelter and refinery upon the coast where British Commerce can be maintained economically with the Orient would insure a market of the first magnitude in extent and monetary returns. If that assumption is correct, he emphatically declared, that such a smelter should be subsidized by the Government. Such a subsidy should not, however, be given to bolster up a more or less problematical venture, but as a return for Government Supervision of rates so that the producer of ores might be for all time assured of a fair return for his labor and his capital. He declared that he was not in favor of Government ownership which, in his opinion, was merely another expression for wanton waste. Government regulation, however, was a different thing, "but again," he said, "I wish to qualify by saying that a regulation must be as unrestricted as possible, always keeping in mind that the smelter is as important to the mining industry as the producer and that, until both are satisfied by a spirit of mutual confidence, neither can prosper to the limit warranted for instance by the great mineral wealth of this Province."

"Speaking still emphatically I cannot see any argument," he continued, "against proper Government regulation that will guarantee to the producer a fair share for his labors and the smelter a fair return upon the great capital necessary to the success of any such venture. If a smelting company be honest in its methods and its settlements and for the purpose of this discussion we may assume that smelters in British Columbia are unlike some prototypes on the other side of the line, then there surely can be no objection on their part to a fair impartial regulation that will forever remove the most prolific cause of dissention and distrust. If, on other hand, there should be smelters that do not conduct business with due regard to the broad interests of this Province — and that means full encouragement of the producer — it is time the conditions were changed that the Province may come fully into its own in the mineral producing way."

Mr. Norman asserted that British Columbia possessed the best mining laws under the sun and he thought it was logical that its Government should take the lead in settling the smelting question in such a way that would lead to a much better understanding between shipper and smelter and thus increase the volume of its mineral production. He went on to deal with the Trail Smelter saying that the former spirit of co-operation and mutual trust between that Company and its patrons had given away to distrust and bickering. Smelter officials contended that the rates now in force were as low as could be granted under the rules of good business while the shipper asserted that he was not getting a fair share of the proceeds of his work and his capital. This, the speaker said, clearly proved the necessity for some regulating force that would remove the cause of friction that militated against full development of interior mining districts and would continue to do so until the shippers felt that there was some final court to which they might appeal in cases where injustice had occurred.

Mr. Norman proceeded to deal with general conditions on the American side and in Canada in respect to the smelting industry. He asserted that it was folly to suggest that Canada could disassociate itself with what was occurring in the United States in regard to this matter. The interests of the two were closely co-related and there was no escaping the fact that, as smelting corporations, whether on the American or Canadian side, work closely together, what might be done south of the imaginary line was bound to make its influence felt to the north. Touching upon a few of the arguments which he had heard advanced against the proposed proposal of Government regulation smelters Mr. Norman said that they amounted to nothing and that in point of fact there was no logical reason why the present unsatisfactory condition should not be improved in the manner indicated.

Concluding Mr. Norman said, "The world is on the eve of great changes and I submit that smelting corporations will be untrue to the best interests of the people and remain contributors to a condition of unrest that has hindered development in the past if they refuse to give these arguments consideration. We are at the parting of the ways on the threshold of a new and better era."

"The corporation that refuses to sense these changes and fall in with march of progress might easily find itself engulfed in a wave of Government ownership that will sweep it out of individual existence forever. The leaders of industry who realize the situation and go forward to meet it with the single purpose of advancing the best interest of all the people will erect greater monuments than those who refuse to be swerved from their sole purpose of wringing money from the public. I honestly believe that Government regulation must come sooner or later and that wisdom dictates adjustment to changed conditions without delay.

The Better Preparation and Utilization of Coal.

"The Better Preparation and Utilization of Coal" was the next paper presented. It was given by Mr. G. W. Evans, Coal Mining Engineer, North West Experiment Station, U. S. Bureau of Mines, Seattle. He stated at the outset that his remarks would not be specifically with regard to the bituminous coal of British Columbia. As, however, the coal of this character in the State of Washington was similar to that of this Province the problems confronting the people of the two countries in this respect also were similar. His plea was for the greater use of the smaller sizes of coal, largely disregarded by both producer and consumer. Coal operators in both British Columbia and Washington knew that the percentage of large sizes is decreasing and the quantity of small size coal is increasing. This change, he said, had been brought about partly by the inferior class of coal miners of to-day compared with former years. To-day some of the coal miners particularly in the State of Washington knew only how to drill a hole and fire a shot, some did not know even how much powder should be used. The result was that the coal is shot into small pieces and in steeply pitching coal beds the coal is further broken up by falling down the chutes. It was therefore necessary to face the inevitable fact that the percentage of lump coal will decrease and the small sizes are going to increase as time goes on unless new coal fields are discovered. It behooved us for these reasons to make preparations to save more of these smaller sizes and offer them to the public in the cleanest possible condition. To separate impurities from the coal in the smaller sizes was a more difficult matter than to clean the coal of larger size. In the anthracite coal fields of Pennsylvania dry cleaners were used for the smaller sizes and, at one bituminous mine on the Strait of Washington, a spiral separator was tried with only partial success. It has been found, the speaker asserted, after years of experimenting that treating the coal in a liquid thus taking advantage of the difference in specific gravities between the coal and its associated impurities is the only practical way of making a proper separation. Experience, he said, has taught that, in order to get the best results in the washing of coal, the washer should be of proper design properly adjusted and operated. He had seen plants where tubs appeared to do pretty good work, but for a new plant would not recommend the tub except in an emergency. Mr. Evans proceeded then to describe some of the coal washing plants that are now being built and after describing the various methods of their operation declared that to get the best results a thorough study should be made of the coal to be washed and the type of jig installed that would best suit the purpose. Such studies and designs should be studied by someone competent to make such investigations. He did not advise ordering from a catalogue, suggesting that the operator should take his coal washing problem to a specialist and ask for a guarantee so that the resultant product would measure up to certain specifications. In this connection he said, "Our coal washing plants are being built with more refinements each year in order to successfully meet the requirements exacted by more complex coal and an effort to practice true conservation."

Mr. Evans recommended that operators should pay more attention to the efficient operation of their jigs. Very few could tell what results they were getting, and little did many of them realize that the amount of good coal going to waste or the percentage of absolute waste in the wash product can be determined by a proper study with a "float-and-sink" machine, and the necessary corrections made in the jig. Briefly outlining the manner in which this work is done, he said: "Samples are taken every thirty minutes for a period of eight hours at different parts of the plant. Careful head samples are taken of the material going into the washery; also samples are taken at each of the refuse discharge gates of the machine, and as the washed product passes over the conveyor from the jig, it too, is carefully sampled. Next day each of these samples should be treated about as follows: The original samples should be coned and quartered—care being taken not to break the particles in the sample—until a representative sample of about 40 or 50 pounds is obtained. This smaller sample is further quartered until the required size sample is secured, which is to be used in the "float-and-sink" machine. The machine is then filled to the required height with a solution of zinc chloride of the proper density. This particular density is called the permissible bath for the coal under consideration, and might range from 1.35 to 1.65 specific gravity, depending on the amount of adherent ash in the coal and the amount of ash the coal market will assimilate. The head sample is then run through the machine. The marketable product will float, and the refuse will sink. Each part is weighed and in this manner the percentages of each are determined. The results obtained on the head sample indicate what the washers should produce if they are working at an efficiency of 100 per cent. The "float-and-sink" machine, by the way, is assumed to be a 100 per cent efficient separating machine. The refuse is treated in the same bath, and if the washer is doing perfect work, there will be no float, and in treating the product there should be no sink. This seldom happens. The percentage of float in the refuse and the percentage of sink in the product are used as factors in determining the efficiency of the coal washer. By making these determinations adjustments of the length of stroke of the jigs and experiments with the sizes to be treated to get the desired results can be made. The man who operates the jigs will more clearly understand what is required of him and the machine he is paid to operate.

Quoting from a bulletin published by the Commission of the Conservation of Canada on the Conservation of Coal in 1914 Mr. Evans enumerated the equipment of which the principle collieries of British Columbia were provided in respective washers at that time. He pointed out that the same authority estimated that the cleaning losses are as follows: Hosmer Mine, no loss because small size is coked; Nicola Valley Coal and Coke Company, no estimate; at the Western Fuel Company's Mine, the sludge and other unmarketable coal is used under the Company's boilers and in the Northfield Mine of the same Company, it is estimated that the sludge loss is 2%; at the Vancouver Nanaimo Company's plant the coal less than one quarter inch was wasted, no estimate was made as to the amount. There is fifteen per cent. of the output of the Fiddick Mine of the Pacific Coal Mines, Limited, that is wasted; at the Extension Colliery of the Canadian

Colliery Company it is estimated that about 34% is wasted in bone and slack and at the Union Washery of the same Company there is a waste of 24%. "Of course these percentages," Mr. Evans said, "do not all represent clean coal, but it is safe to assume that between 5 and 10% greater recovery could be made in treating the Nicola Valley and Vancouver Island coal if crushers were used on the larger impurities such as bone and coal and shale from the picking tables and the middlings from the jigs and the crushed material either treated on tables or in jigs; and if the bird's-eye or sludge now being wasted were treated on properly designed tables these are features well worth considering very carefully. A seven per cent. saving on the coals for these two fields would probably equal 140,000 tons, which in itself is worthy of an effort.

"At one plant in the State of Washington using a well known jig I personally saw 80 lbs. of white rock picked from seven tons of coal that was supposed to have been cleaned by that jig, yet the Company, which was paying a man good wages to attend to the jig, wonders why the people of Seattle complain at the amount of impurities in the coal. Let us have more study and education along this line."

"Until recently we were satisfied to let the refuse from the jigs go to the waste dump without further thought; to-day many of the progressible Companies are crushing some of the refuse and all the middlings and treating them either in another jig or on properly designed tables.

"Also until within the past few years little thought was given to the waste water and smaller sizes usually called bird's-eye or sludge, but at present in some plants the waste water along with its load of small coal and associated impurities are conveyed to a settling tank and from the settling tank are fed to properly designed concentrating tables. The tables generally used are what might be called nephews of the old Wilfley table, familiar to ore dressing engineers. As a rule the riffles used are higher and the surface of the table is differently arranged.

"A coal cleaning plant operating along most modern lines does not waste very much except the color in the water. Probably some enterprising engineer will attempt to recover the color by means of an Oliver filter."

Mr. Evans stated that coal operators might ask what was the use of all this refinement in coal preparation and saving of small sizes when they were unable to dispose of one-half the small coal on hand. This lead him to the second part of his paper under the heading, "The Better Utilization of the Small Products from the Washers." He said that the product of such a field as that of the Crows' Nest gave rise to no problem because the smaller size can readily be used in making coke. It was different, however, with non-coking, bituminous and sub-bituminous coals.

Continuing he said, "In many of the large steam plants mechanical stokers of some form are in successful operation. They burn the small sizes efficiently with little or no smoke given off. The ash formed is disposed of mechanically. In fact, everything goes along pretty well in a very large plant, but only the larger plants can afford to install mechanical stokers. In the smaller plants where the installation of large stokers is not justified because of the expense the boilers usually are fired by hand. In plants where the expense of installing large mechanical stokers is not justified or even where justified in some instances powdered coal equipment is now being installed. To-day we find that pulverized coal is being used in many steam and heating plants of some cities. Several large buildings in Seattle have recently replaced California fuel oil with powdered coal and, according to the statements of the engineers in charge of those plants they like the powdered coal best.

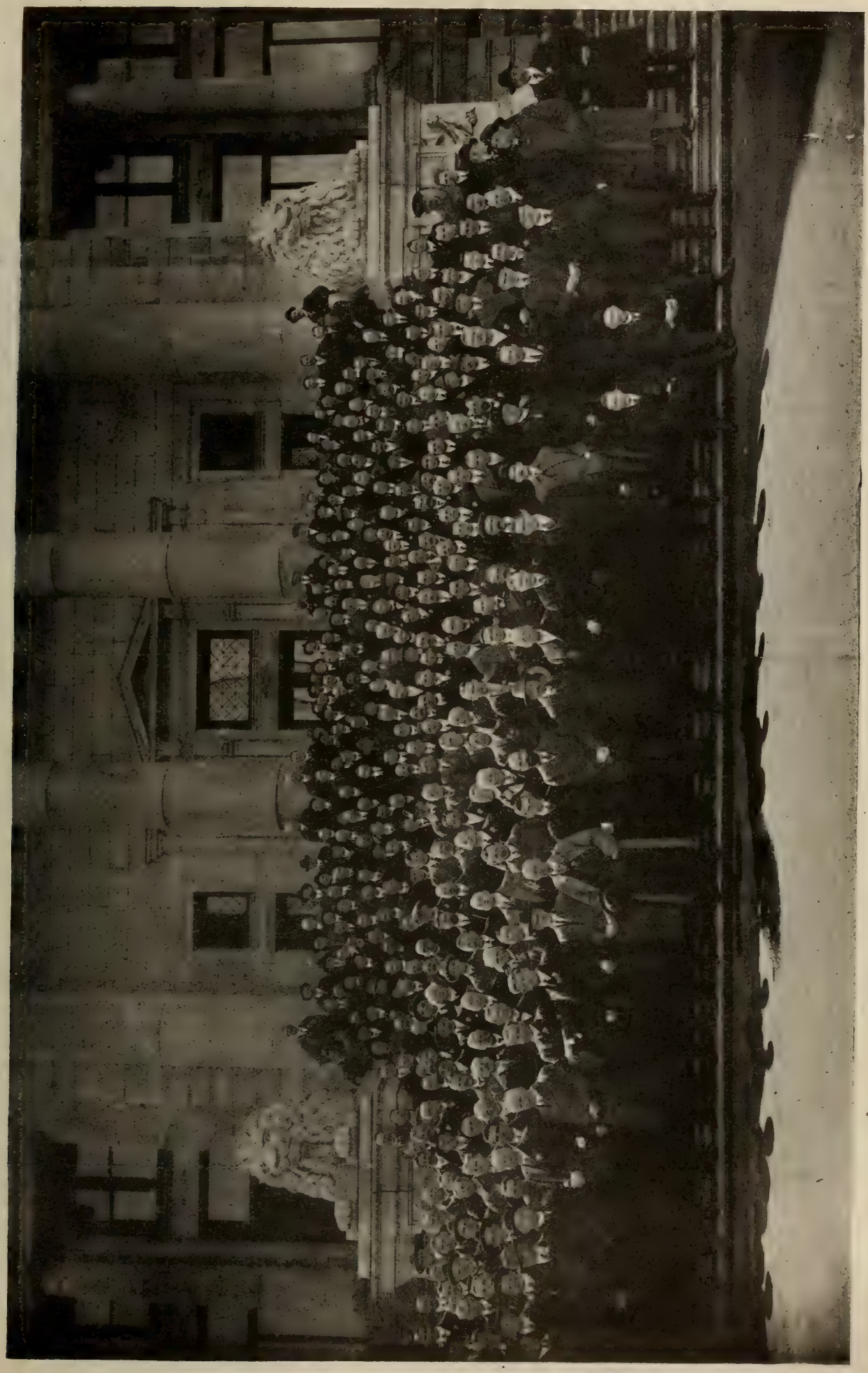
The speaker proceeded to enumerate some of the powdered coal installations in the State of Washington, mentioning the Western Avenue plant at Seattle, the Puget Sound Traction Light and Power Company and describing equipment. The coal was ground so that 95% of it will pass a 100 mesh screen renton buckwheat and bird's eye or sludge is used. "In this connection," Mr. Evans stated, "it might be well to mention the fact that at the Renton coal mine the Company years ago was forced to dike their bird's-eye and not allow it to go into the streams with the waste water because of protest from the neighboring farmers. To-day they are loading coal from the pile of 160,000 tons saved by means of a drag scraper and utilizing it in their Seattle Powdered Coal plant. This is a plan that others might follow to their advantage." Other installations mentioned were the Superior Portland Cement Company's plant at Concrete, Washington, that at Briquettville, Washington, where the powdered coal used in some of Seattle's largest buildings is pulverized; that of the Pacific Coal Company at the Black Diamond Coal Mine. At Black Diamond, he said, the smallest sizes of the black diamond coal are used which is non-coking bituminous; at the Coal Creek plant of the same firm they were using the smallest sizes of the sub-bituminous coal of the Coal Creek mine; at Briquettville they were using a mixture of Black Diamond-Coal Creek and the coking bituminous coal of the Burnett Mine.

The following well known buildings of Seattle, it was stated, are using powdered coal; the Seattle Natatorium or Crystal Pool; New Richmond Hotel; Broadway High School and the forty-two story L. C. Smith Building. The air pressures used at these plants ranged from two to three pounds and the pulverized coal was hauled to Seattle in five ton air-tight tanks from Briquettville, a distance of twelve miles.

Mr. Evans followed with some notes taken from a detailed report of a twenty-four hour test made during February, 1919, on a Babcock and Wilcox boiler of 600 H.P., which during the test had a rating of 125%. Without going into the details he quoted a few of the economic and efficiency results obtained:

Water fed per pound of coal fired	8.50 lb
Water evaporated per pound of dry coal	8.35
Equivalent evaporation from and at 212°F per pound of combustible	11.30
Calorific value of one pound of dry coal	11,660 B. t. u.
Calorific value of one pound of dry combustible coal	13,700 B. t. u.
Efficiency based on coal fired	78.95%
Efficiency based on combustible	60.05%

Continuing Mr. Evans said that there was quite an accumulation of slag on the slooping sides of the furnace which is removed at intervals of one to two months when it has accumulated to a thickness of six to twelve inches. The ash also accumulated in the boiler tube was removed by the aid of a soot blower.



International Mining Convention, Vancouver, B.C., March 17-19, 1919.

The condition of smoke was very light; there was no back lash; the best effect on the brick works was not noticeable; there was no pulsation and it was the opinion of the engineer who made the test that the results were very satisfactory. The coal used was screenings from the Issaquah Mine of the Pacific Coast Coal Company which is sub-bituminous.

Dealing with comparative costs of fuel oil operation with powdered coal, Mr. Evans quoted some observations from a book written by Mr. C. F. Harrington, mechanical engineer, on the use of powdered coal. After giving statistics the speaker pointed out that the conclusion was that, with fuel oil at $2.00 per barrel and washed bird's-eye coal at $2.50 per ton there is a marked saving in favor of powdered coal.

"For the smaller apartment houses, hotels and small steam plants that cannot afford to install either the large mechanical stoker or the powdered coal equipment some other provision must be made. This field of fuel consumption appears to be well taken care of by a mechanical stoker invented in Seattle within the past few years which is known as the American Smokeless Stoker or Burner. This stoker works automatically. It is of the under-fed type and is designed to be used where the amount of coal consumed is not as large as in a large steam plant. A coal bin connected with the screw feed of the stoker is filled with coal and after a fire is started in the bowl of the stoker the apparatus is started. This stoker or burner is constructed so that it can be controlled first by hand for plants that have the constant attention of an engineer who regulated the rate of feed by means of a three-speed belted pulley; second by steam pressure control in which case an electric switch is thrown on or off and can be adjusted at will; third by thermostatic control whereby the switch is operated by a rise or fall of temperature beyond fixed positions. These positions are also changeable.

The following data were furnished by the manager of the American Smokeless Burner Company. In two houses in Seattle the fires have run for two winters without being relighted and in the case of the smaller of the two stokers it ran all of last winter and kept the house at a constant temperature of 75 degrees. All the owner did was to fill the hopper which holds 140 pounds of coal every day or two and remove the ashes every four or five days. The fuel used from October to the following June cost $20.00, the price per ton being $3.15. The building is a two story wooden building of eight rooms. At another plant before the stoker was installed the coal used cost $4.50 per ton, and it was impossible to keep the house warm. Since the stoker has been installed coal costing $2.75 per ton has been used and the apartments have been thoroughly heated. It takes only one hour of a man's time per day to fill the hopper and remove the ashes, hence one fireman could take care of several apartment houses equipped with this form of stoker.

Comparing powdered coal with fuel oil Mr. Evans pointed to the analyses of some western coals. These show that they average ten thousand B. T. U. per pound, that is, figuring conservatively, 20,000,000 B. T. U. per ton. If California fuel oil averages 18,500 B. T. U. per pound and 7.8 pounds to the gallon, 42 gallons to the barrel, we would have 6,000,000 and 60,600 B. T. U. to the barrel. It takes, therefore, approximately 3 and 1/3 barrels of oil to the ton of coal. The oil would have to be sold at 80c per barrel to be on a parity with coal at $3.00 per ton. With fuel oil at $2.00 per barrel you could afford to pay $6.66 per ton for the coal except the cost of handling the ash which is not great. There is no smoke given out by the stacks of these smokers when they are operated properly.

Mr. Evans added that a smaller stoker has been invented, but has not yet been placed on the market. Some of its features resemble the operation of the American Smokeless Stoker. It is designed to burn as small an amount as one pound of coal per hour and to be used in residences and the smaller homes. This stoker can be controlled with a thermostate or an electric push button in any part of the house.

Concluding the speaker said, "By definite team work on the part of the coal producers, the coal salesmen, the fuel engineers and the public a large percentage of the small coal now being wasted can be saved to the coal company and the State or Province. Such team work will be a factor in successfully overcoming the inroads made into fuel markets of the Northwest by California fuel oil and cause this same oil to be utilized along lines where it will do the greatest amount of good. The oil supply of the world is very limited and should be conserved. The supply of coal in the Province of British Columbia and [illegible] State of Washington not to consider the coals of Oregon and California are sufficient to last the needs of the Pacific Coast States for hundreds of years and why not utilize these caols to the best advantage? By practicing true conservation we will make the supply last longer and the consumer will be able to buy a better grade of coal at a cheaper price.

Mr. Francis Glover, of the Princton Coal and Land Company, of Princeton, B.C., in dealing with the better Utilization of British Columbia Coal, suggested that the Government should introduce legislation preventing the coal lands falling into the hands of speculators whose one idea was to hold them in order to sell at a profit. Engineers, he said, should be appointed by the Government to see that coal was not extracted by wasteful methods. As to operators, he declared that they should realize that all conditions relative to the human element should be of the best. By this he meant safety condition, living condition and working condition. They ought to have the most up-to-date machinery and tackle and should be ready at all times to work in harmony with labor, referring disputes to the Government Board of Control and abiding by the decisions. On their part, the laborer should realize that production is imperative to the success of the coal industry, and it was his duty to handle idlers and malingerers. He spoke of the necessity of the railways providing the best transportation facilities possible and expressed the opinion that in the past one of the great drawbacks to the profitable mining of coal in British Columbia has been the intermittent tonnage. By this he meant periods of slackness and periods of great activity. This lead, during the slack period, to the deterioration of workings and roadways, and had the effect also during the periods of great activity of tempting operators to attain a ficticiously high output by following the line of least resistance and neglecting development work. In speaking of the present methods of burning coal he termed them a disgrace, and thought that there should be some effort at an educational campaign that would result in the practice of economy by the general public. Mr. Glover also dealt in a general way with the problem of utilization of the many valuable by-products of coal.

The Prospector.

Mr. John McConnell spoke on the "Prospector; What He should Be and How to Encourage Him." He spoke

of the absolute necessity of prospectors and the prospector's work in a mining country, especially a mining country in the early stages of development. Because of the pioneer work which he did, it was his opinion that every encouragement and assistance should be accorded these men. He said that the prospector's problem was his grub stake, and the speaker recommended citizens of Vancouver might give more attention to prospectors looking for such backing. It was a gamble, of course, but a gamble of the most fascinating nature. The odds were against the return, but if reward was obtained, it was likely that it would be of a very generous nature in proportion to the investment. Mr. McConnell thought that the prospectors might be given more aid in the work of developing their prospect to the end that they might become operators. He recommended too, that because of the complex nature of British Columbia ores such representation should be made as would bring about the establishment in the Province of ore testing mills in different mining centres. Plants of this nature, he said, would be a very great help to those engaged in mining in a small way. He thought that plants might well be established, one as an adjunct to the Scientific Department of the University of British Columbia, another in Nelson to supply the needs of the interior mining districts of British Columbia and a third at a point in the northern interior. These plants he recommended should be under the direction of skilled metallurgists who would in turn be under the jurisdiction of the Provincial minerologist.

In the judgment of Mr. McConnell, the Government also should construct at least two concentrating plants, one at Hazelton or some suitable point in the Northern silver lead district and one in Kootenay preferably at Nelson to take care of the southern galena belt. Referring again directly to the prospector and his welfare, Mr. McConnell recommended that a course in mining should be given at the University of British Columbia for his benefit and also that the Government might consider in dealing with the returned soldier problem the possibility of grub-staking those returned men who would prefer to prospect unexplored areas of the Province for mineral. This support, he suggested, might be limited to one or two years but he thought that such a measure would be largely taken advantage of and very much appreciated besides materially assisting development of the mining industry of the Province.

Taxation of Mines.

"Taxation of Mines" was the subject of an address by Mr. Valentine Quinn of the Granby Consolidated Mining and Smelting Company, Vancouver, B. C., and he was followed by Mr. T. W. Bingay of the Consolidated Mining and Smelting Company and Mr. Niclo Thomson, Chairman of the Mining Committee, Board of Trade, on the same subject. Mr. Quinn's address dealt with the principals which should be followed in his opinion in the taxing of mining properties. He said there were three cardinal features governing the employment of capital namely, its ultimate return to the proprietors, its safety during use, the interest or rent to be paid by the borrower. He observed that if capital is to be obtained its return to the proprietor when no longer employed must be assured and said that income might briefly be epitomized as the difference between the amount of money you take in less the amount of money you have to pay out incident to the operation. After some further amplification he laid down these principles:

(1) Capital must be assured protection during employment and ultimate return when its loan term is ended.

(2) Capital must receive a reasonable percentage of the earnings derived from its use.

(3) Income is only truly defined as the difference between earnings and the cost of their production and included in such cost must be the necessary provision for the first two items enumerated.

Further explanation of his position was given with the result that the conclusion was reached that interest on capital employed is a fair and equitable charge on the income its employment produces and therefore it should not be taxed.

He spoke of the possibility of considerable difficulty arising in the obtaining of outside money or capital for an investment in British Columbia mining enterprises if the course were pursued of making no allowance for interest on bonds in connection with taxation. He referred also to other proper exemptions, and concluded by saying that if a refinement of the Income Tax Act could be secured eliminating the indeterminate basis "on which it is presently proposed to assess the mining industry and taking into account the necessity of not only inducing new capital to come into the province, but permitting the repayment of capital already invested to be periodically provided for as well as to receive a reasonable return on its use, say 7 per cent, before determining the taxable income it would go far to wards developing the financial end of British Columbia's mining industry.

Addressing himself to the same question, Mr. Bingay arrived at practically the same conclusion. He thought that the Government should in its taxation policy exempt interest on borrowed capital in its estimation of what was termed taxable income. His opinion was that it would be more just and equitable to follow the lines laid down by the Dominion Income Tax Act, which applied equally to all individuals and to all corporations, regardless of the size of the income. "If an individual derives income from investments in a company, the normal tax is collected at its source, and he does not have to pay the normal tax again on the same income." Mr. Bingey said that this was not the case in the province, but that the individual paid income-tax first on earnings of the company in which he was interested, then again on the same money which came to him as income from the company. He also criticized the two per cent mineral tax as being inequitable, and felt that a deduction should be made for salaries of non-resident directors and managers. In regard to the allowance for mine depreciations, he did not agree with the limit of 15 per cent set by the Government, thinking it illogical for the Government to take the stand that in no case could a greater depreciation be suffered.

Mr. Nicol Thomson followed along the lines of the previous speaker endorsing in unqualified terms their arguments and their conclusions. He thought that any taxation should be based on the net income and not on the gross income, and that proper allowances for exemptions should be made for depreciation, development charges and so forth. This, he thought, was only right, inasmuch as the mining industry was one of very great importance to British Columbia, that it was at a point necessitating the acquirement of considerable sums of outside capital and that any undue burden in the shape of taxation could not but have the effect of discouraging investment.

The resolutions to which reference already has been made then were dealt with, as indicated, after which the Convention adjourned.

In the evening, the delegates assembled around the banquet table in the magnificent ballroom of the Vancouver Hotel. After the offerings of an excellent . . . . . which was duly appreciated, Mr. Fred T. Congton, K.C., former representative of the Yukon Territory in the Dominion House of Commons was called on for a short address. He congratulated the British Columbia Chamber of Mines on the splendid convention held under its auspices, expressed the opinion that it could not but be of very great benefit to the mining industry of the province and was of the opinion that such assembly should be repeated annually. In touching upon the Yukon, he said that it was a fallacy to suppose the Yukon Territory or Alaska had been in any way depleted in their mineral possibilities. Both these vast territories offered splendid opportunity to the prospector and explorer. He spoke of the fine type of men which the Yukon had turned out, referring to the whole country as a university which taught the traits of true manhood and developed in its people courage, enterprise and intellect. The climate, too, was greviously misunderstood. To talk to people in Eastern Canada and even in the West one would imagine, he said, that Alaska and Yukon were horrible places to live, the climatic hardships almost unendurable. This was absolutely untrue. It was true that there were occasional cold snaps. It was true also that if the people of Vancouver had to endure a temperature of 30 deg. below zero living in houses such as theirs were they would probably wake up in the morning to find themselves frozen stiff . (Laughter.) But in Dawson these trifling cold snaps were scarcely felt, in fact, they were considered desirable, as providing the necessary pep and stimulation for work. Seriously though, he wanted to put himself on record as stating that the climate of Dawson all the year round could not be beaten, and that for six months in the year it was much finer than anything that could be found in so-called sunny California.

The mineral and industrial possibilities of Prince Rupert and adjacent districts were the subject of a short address by Mr. A. C. Garde, the delegate from the City of Prince Rupert. Mr. Garde was very enthusiastic; pointed to the resources of the section from which he comes, and declared with unreserved enthusiasm that Prince Rupert was destined to become one of the most important communities or centres of the Pacific Northwest.

The importance of developing the iron ore deposits of British Columbia was the theme of an address by Mr. M. J. Carrigan, of Seattle. The substance of his remarks already has been dealt with. Briefly he declared with all the emphasis at his command that this province has the iron ore in sufficient quantity and of the required quality to make the establishment of a modest-sized smelting plant absolutely practicable. He commended the Minister of Mines for so stating in a public manner and with equal emphasis urged the people of the North-West to be up and doing in this matter in order that the shipbuilding industry may be maintained.

On Wednesday, the Convention was brought to a close with a trip to the mine and plant of the Britannia Mining Company, which is situated within a day's return journey from the City of Vancouver. A special invitation was given the visiting delegates and every opportunity afforded them to become acquainted, at least to some extent, with one of the largest and best managed mining enterprises of America.

General View, Consolidated M. & S. Co. Smelter, Trail, B.C.

British Columbia's Mineral Production in 1918

The value of the mineral production of British Columbia for 1918 is estimated at $41,083,093. This is an increase of about 11 per cent. over that of the previous year.

Mineral Production For Two Years, 1917-18.

	—Production, 1917—		——— Estimated Production, 1918 ———			
	Quantity.	Value.	Quantity.	Value.	Increase.	Dec'se.
Gold, placer ..oz.	24,800	$ 496,000	15,400	$ 308,000	.....	$188,000
Gold, lode ..oz.	114,523	2,367,190	157,276	3,250,895	$ 883,705	.....
Total gold ..	.....	$2,863,190	.....	$3,558,895	695,705	.....
Silver ..oz.	2,929,216	2,265,749	2,886,861	$2,601,120	335,371	.....
Lead ..lb.	37,307,465	2,951,020	43,949,661	2,944,627	.....	6,393
Copper ..lb.	59,007,565	16,038,256	63,387,010	15,681,946	.....	356,310
Zinc ..lb.	41,848,513	3,166,259	36,149,894	2,501,573	.....	664,686
Total metalliferous ..	.....	$27,284,474	.....	$27,288,161	3,687	.....
Coal ..tons	2,149,975	$7,524,913	2,292,068	$11,460,340	3,935,427	.....
Coke ..tons	159,905	959,430	190,656	1,334,592	375,162	.....
Total collieries ..	.....	$8,484,343	.....	$12,794,932	4,310,589	.....
Miscellaneous and building materials.	.....	$1,241,575	.....	$1,000,000	.....	241,575
Total production ..	.....	$37,010,392	.....	$41,083,093	$4,072,701	.....

It will be noted that the coal and gold companies are responsible for the satisfactory increase, there being a decrease in value of zinc, copper and building materials.

In the case of coal there was an increase in selling price as well as output. The increase in value of gold is, of course, an exact indication of increased production.

The increase in value of silver output is directly attributable to the higher selling price, there being actually a small decrease in output.

The increase in gold production is to be credited chiefly to a new mine, the Surf Inlet property of Canadian Belmont Mines, which made an output of about 43,000 oz. The Rossland mines have usually contributed about one-half of the province's gold, but during the past two years only about one-quarter the normal output has been made. Only very small shipments were made during the latter part of 1918. With the improved conditions for gold mining, it may be expected that production in 1919 will be much larger.

Most of British Columbia's silver comes from the Slocan district. In 1918 47 per cent. was credited to the Slocan. The Surprise, Queen Bess and Standard mines are large producers.

British Columbia is Canada's chief producer of lead. The total amount of lead produced in 1918 is estimated to have been 43,949,661 lbs., valued at $2,944,627. This represents, as compared with the previous year, an increase in quantity of 6,642,196 lbs., but owing to the lower market price of lead a decrease in value of $6,393.

The Sullivan mine, in the Fort Steele division is responsible for much of the lead output. The North Star, Queen Bess, Surprise, Standard, Blue Bell, Florence, Hyland and Cork-Provinces mines were among the large shippers in 1918.

The decrease in coper was in value, not in quantity. The production is estimated at 63,387,010 lb. for the year, an increase of about 7.4 per cent. over the previous year.

The Hidden Creek mines and the smelter at Anyox of the Granby Consolidated Mining and Smelting Company were operated practically continuously throughout the year, although closed for a short time by a strike, which was soon settled. A larger tonnage was treated than in 1917, amounting to approximately 828,000 tons, together with quartz and limestone flux to the extent of some 80,000 tons. With the increased tonnage handled there was a corresponding increase in the output of copper, approximately 30,400,000 lb. being produced, as compared with 27,661,301 lb. in 1917.

In the Boundary District the Granby Company's mines at Phoenix were unable to supply the smelter at Grank Forks with sufficient ore to run the smelter at capacity. The ores reserves of these mines are approaching exhaustion, so that the large-scale production of former years cannot be maintained. Also the high operating costs during 1918 left but little margin of profit in working the low-grade ores at Phoenix.

The Canada Copper Corporation, operating the Mother Lode mine and smelter at Greenwood, treated a slightly smaller tonnage than in 1917. About 165,000 tons were handled, from which approximately 2,200,000 lb. of copper was recovered, together with low gold and silver contents. Towards the end of the year the smelter was closed, the ore-reserves at the Mother Lode mine being exhausted.

The Britannia mine had a very successful year, approximately 750,000 tons of ore being milled, the production of copper from which is estimated at 18,250,000 lb. This is nearly 2,500,000 lb. greater than the 1917 production.

The Marble Bay mine, on Texada island, made about the same production as in 1917; the output is estimated at 740,000 lb.

Copper mining is now firmly established as the most important form of mining in the Province, and from all indications it should maintain this place for years to come. In 1918 the value of the copper mined

exceeded by over $4,000,000 the combined values of all other metals mined, and it formed 38 per cent. of the total value of the mineral production for the year.

It is also to be noted that 80 per cent. of the copper output is produced on the Coast, which has become the centre of the copper-mining industry, thus replacing the Boundary District, the old centre.

The quantity of zinc estimated to have been produced in 1918 amounted to 36,149,894 lb., which, compared with 41,848,513 lb. produced in 1917, shows a decrease of 5,698,619 lb. The estimate on zinc-output, however, may be low, as it has been difficult to get information regarding shipments to the United States. This production is valued at $2,501,573, which shows a still further proportionate decrease, as compared with the 1917 value of $3,166,259, due to the decreased market price of the metal.

It is estimated that the gross production of coal was 2,572,811 long tons, of which 280,743 tons was made into coke, leaving the net production at 2,292,068 tons. These figures show an increase, as compared with 1917, of 174,096 tons gross and an increase of 142,093 tons net. The quantity of coke made was about 190,656 tons, which is an increase of about 30,751 tons as compared with 1917.

COPPER MINING IN BRITISH COLUMBIA.

Glory-Hole, Granby Co.'s Mine, Anyox.

Stoping, Granby Co.s Mine, Anyox.

New Marcus Tipple at Granby Co.'s Coal Mine

There has been published from time to time in these columns information concerning the new mining plant of the Granby Consolidated Mining, Smelting and Power Company, Ltd., at Cassidy Siding, near Nanaimo, on Vancouver Island. It is not our purpose here to go into the detail of mine development or the surface plant, as a comprehensive article will later be published by the engineers for the company, the Taylor Engineering Co., Ltd., of Vancouver, B.C. It is sufficient to state at this time that the arrangement of camp, housing facilities for the comfort of the employees, shops, bath house and boiler equipment is second to none in the West, the entire arrangement lending itself readily to the ultimate development of this property.

The engineers entrusted to Roberts and Schaefer company of Chicago the development of the tipple, and in view of the agitation against anything other than a solid body car, and consequently the use of rotary dumps, and also the careful consideration that must be given now that the war is over, to the better preparation of coal by picking or washing, it is opportune that the readers of this journal should have called to their attention the general arrangement of this plant.

The Tipple at Granbys New Coal Mine, Cassidy, Vancouver Island.

In locating mine car tracks, tipple and proposed washery, sufficient room has been provided for the storage of loaded cars pulled out of the slope, the loads being permitted, after passing over the knuckle to drift on and down grade at ground level to the loaded trip feeders, which feed the cars, one at a time on to the loaded car-haul.

After the cars have reached the top of the loaded car-haul, they drift over a platform scale and then on towards the rotary dump. This rotary dump is of the Head-Wrightson type, the Canadian rights of which, together with the Canadian rights of the Marcus patent picking table screen, have been entrusted to the care of Roberts and Schaefer company since the outbreak of the war. This type of rotary dump is not new to coal operators of Western Canada as it has been in successful use at a number of mines, but probably no where has it operated using a car of such large capacity as at Cassidy Siding.

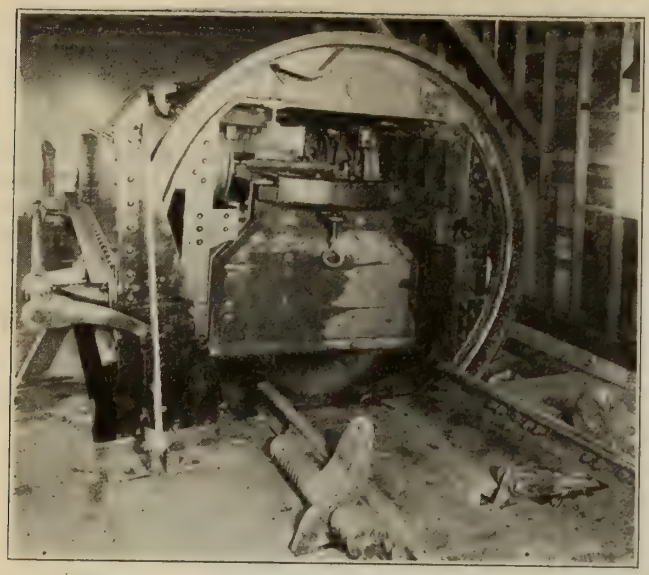
Another feature of interest in connection with this dump is that it is provided with Mining Safety Device Company's feeders, so that the feed of cars to the dump is automatically controlled, thereby avoiding delay and liability of wrecks which might happen if the cars were not regulated into the dump. All parts of the car feeders and revolving dump are of very substantial construction and are easily accessible in case repairs are necessary.

The empty cars standing in the revolving dump are started forward by the load entering, the arrangement of tipple tracks being such that empty cars run by gravity from the rotary dump to the kick-back and thence to the empty track, from which they are lowered by means of a car-haul to the ground level; whence they can drift on to either of the empty storage tracks for making up trips preparatory to lowering into slope.

Provision has been made for handling mine cars loaded with rock by taking off the rock cars at the head of the loaded car-haul, passing them over a rock track, which leads to a rock bin—this, however, for future requirements, at which time a duplicate revolving dump will be placed over the rock bin. The empty rock cars will drift by gravity back to the empty mine car track of tipple and thence on over the down haul to the empty yard.

For the early development of the mine the rock will be handled over the rotary coal dump, a by-pass being provided in the chutes leading from the dump so that the rock can be diverted into a temporary rock bin from which it is disposed of by means of wagons. Provision is also made in connection with the rotary dump and chutes leading therefrom to handle local trade or house coal.

The coal from the rotary dump is delivered into a receiving hopper from which it is mechanically fed on to a 5′ wide Marcus horizontal screen, the upper deck of which is provided with perforated plate for producing lump, nut and slack coals on three tracks as shown, or combinations of these sizes as might be desired.



The Rotary Dump, Granby Coal Mine.

Provision is also made in connection with the Marcus Screen for diverting the nut and slack coals to a conveyor which delivers this nut and slack mixed to the elevator of a washery which is now being installed by the Roberts and Schaefer Company, or the slack from tipple can be diverted to the conveyor leading to boiler-house.

Ample facilities are provided in connection with the Marcus screen for thoroughly picking the lump coal, and after passing over the lump perforations it is delivered without breakage on to an apron conveyor type of loading boom which lowers it into railroad cars.

Pickings from the Marcus table are carried forward in a pickings trough which shakes with and is part of the Marcus screen proper, these pickings being delivered to a refuse bin built in conjunction with the rock bin. Provision is also made in the tipple for delivering bone coal (with some good coal attached), to a crusher from which it is conveyed into the boiler house.

With the arrangements provided for handling mine cars and the facilities provided for preparing and handling the finished coal products, this preparation should prove one that will permit of low cost production, and when the washery is built, will load a product on railroad cars that will be among the best of the Island coals.

Britannia Mine

As you leave the boat at Britannia Beach you notice the powerful little electric locomotive hauling some heavy machinery direct from the boat, and upon enquiry, you will find that this machinery will be delivered with the least possible handling direct to that part of the works for which it is destined. They even have a track to the basement of the store to deliver merchandise.

Going up from the boat, after landing at Britannia you come to a neat, trim office building, where you always find the latch-string out, and Mr. J. W. D. Moodie, Vice-President and General Manager, or Mr. E. J. Donahue, Secretary-Treasurer. The very businesslike and, at the same time, genial greeting with which they greet you, will impress you. It is the same all over Britannia, that genial courtesy is everywhere.

The hotel has a comfortable dining room and the very best of food. At the store employees may purchase the best of everything at city prices. Everything is of the best. The store is exceptionally large, light and airy. It is fitted with a freight elevator, refrigerator system and special storage, for all kinds of foods, barber shop and even a shoe repair shop. Nearby are the steam laundry, blacksmith and machine shop.

Looking to the right as you leave the wharf you will see the bunkers from which the ore is landed on the steamers to be taken to the smelter. At the top of the mill, which is the 4100 ft. level, one first sees the skips used on the incline, and which is operated by a gravity system. Here also you get the first near view of the aerial tram, as the buckets dump their 900 lb. each of ore into the ore dump. This dumping is automatic, then the buckets continue on and are righted automatically and return to the upper terminal, a distance of 13,000 feet at the 27 ft. level. This aerial tram can handle 1,000 tons of ore per day and works 24 hours.

The skips carry ore from the ore bins at the top of the incline to the dump at the mill. They are operated on the gravity system, the hauling being done by a 1⅜ inch cable over an 8 ft. drum. Safety devices and brakes are operated by compressed air, and electric motor. The entire operation being carried on by one operator in a tower at the head of the incline. Each skip has a capacity of 15 tons and weighs, itself, 13 tons. The top of the incline is at the 2,700 ft. level, and is 5,400 feet long on a grade of 30 per cent.

A part of Beach Townsite, showing electric tram-road winding around mountain.

Incline to Mill—Note 1⅜ inch wire cable used to haul skips. Incline is 1,500 ft. from top of mill and is 5,400 ft. long.

Britannia Mine Entertains Delegates

When the committee in charge of the proposed trip to some important mine came back with word that Mr. J. W. D. Moodie, Vice-President and General Manager of the Britannia Mining and Smelting Company, Limited, said he would be only too glad to welcome the delegates of the International Mining Convention at Britannia Beach, the opinion of the Executive Committee was that, if the weather was good, this would be a trip of inspection worth while.

When Wednesday morning, March 19, the day of the trip, arrived, the delegates surely had Mr. Weatherman with them. The day was ideally bright and sunny. Everyone arrived at the boat with a smile and the feeling of good-fellowship was everywhere. The fact that the Convention so far had been a decided success from every point of view was responsible for a great deal of this.

After boarding the S.S. Ballena, the delegates had a good two and a half hours to get-together and talk over old times or business. This was one of the best chances the delegates had for getting acquainted. The orchestra provided music, which did a great deal to enliven the trip.

On arrival of the steamer at Britannia Beach, Mr. Moody was on the dock to welcome the delegates. That arrangements had been made to handle the delegation was amply exemplified when the committee immediately began loading up the cars which were ready on the dock waiting for those who were going direct to the mine. These cars were arranged with seats and hauled by an electric locomotive up to the foot of the incline. Here the delegates boarded the ore skips which took them up the incline 1,500 feet higher up to where the electric railway too kthem up to the mine tunnel.

From the time the members of the delegation boarded the electric tram at the dock until they were back and on board the boat, the employees in every department of the works put themselves out to explain and describe the different departments and each tram load had on board some one of the men in charge to explain the different locations and answer the many questions fired at them by the delegates at the different points. This was especially noted by all of those who made a tour of the mill. Every phase of the workings in this up-to-date plant was explained—from heads to tails.

The majority of the delegates ate their dinner at the company hotel instead of on the boat and found that the meal service here was like everything else at the Britannia Mines—first class.

On the return trip the boat left Britannia Beach soon after 7 o'clock in the evening. After giving three cheers for Mr. Moody and the different men who had showed them such great courtesy on the trip, the start for the return to Vancouver was made.

Pass Resolution of Thanks.

Between songs a few moments were spent in passing resolutions of thanks and commendation by the visiting delegations. There were short speeches by some of the committee. This episode was started by Mr. Buck, correspondent of the "Chronicle" of Spokane, who called upon Mr. Sidney Norman of the Spokane delegation to say a few words. Mr. Norman, after commending the work done by the committee done in connection with the Convention proposed a resolution as from the City of Spokane that the delegates from south of the line extend their sincere thanks to the citizens of Vancouver and the members of the British Columbia Chamber of Mines for the entertainment and courtesy shown the visiting delegates. Mr. Norman stated that, during the past ten years he had attended Conventions all over the States and Canada, and that there never had been one so successfully managed and attaining so much commendation as the present Convention. Mr. Carrigan, who, by the way, has earned the soubriquette of "Pig-Iron" Carrigan, through his memorable address at the banquet, seconded the resolution as coming from the Seattle delegation. In his remarks, Mr. Carrigan said, "At the end not of one perfect day, but of three perfect days, the delegations will return homes after enjoying the hospitality of the British Columbia Chamber of Mines." They came to Vancouver strangers and were going home friends. In fact, he believed that he knew almost everyone present by their first names. Mr. Carrigan stated that he had attended conventions for the past twenty-five years, and that this was the most perfectly managed convention he had ever had the pleasure of attending. The generous sense of business as well as the entertainment had appealed to all. The members of the committee consisting of Mr. J. D. Kearns, Dr. Hodge, Mr. A. M. Whiteside and others were deserving of the greatest credit for their hard and continuous work in carrying through the first International Mining Convention without a hitch. As a virgin effort it was remarkable. The interest developed at the beginning had kept up to the finish. The universal courtesy extended had resulted in sending home the most satisfied delegation ever attending any convention. It gave him the greatest pleasure to second the resolution for the delegates from Seattle.

An Idea of the Late A. B. Clabon.

Mr. Kearns was called upon for a speech and insisted on not being given so much credit for the success of the Convention, stating that everyone of the committee deserved equal commendation as they had all given up a great deal of their time to help make this Convention a success. Mr. Kearns stated that the late Mr. A. B. Clabon, who was formerly President of the Chamber of Mines, originally conceived the idea of the International Convention and Mr. Kearns gave Mr. Clabon his promise two days before Mr. Clabon's death that he would see that this Convention was carried on. He believed in making these remarks that he was doing credit to the memory of a man who had done much for the mining industry of British Columbia.

Dr. Hodge was next called upon and made a few remarks suitable to the occasion.

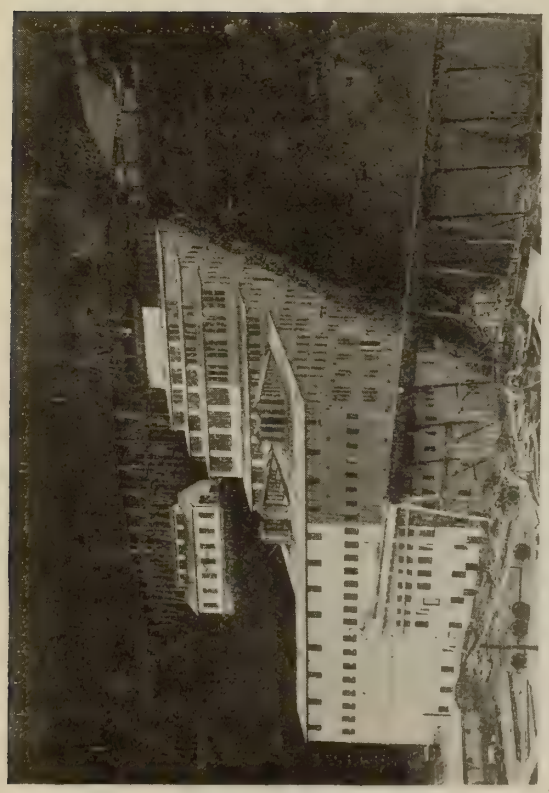
Acting Mayor Woodside expressed his satisfaction at the success of the Convention and extended the thanks of the City Council and City to the members of the Chamber of Mines for making the Convention such a success.

Mr. Norman made a few remarks, speaking of the losses experienced on both sides of the line in the death of many brave boys during the great conflict. He spoke very strongly along the line of these losses, bringing both countries much closer together with the lessons that can be learned from these losses.

Mr. Kearns moved that the thanks of the entire delegation be conveyed to the management of the Britannia Mining and Smelting Company for their hospitality during the trip and that a letter be sent to that effect. This was seconded by Acting Mayor Woodside and carried by unanimous vote.

Beach Townsite, showing employees' houses and department store, where everything may be purchased from a pin to a piano, and at city prices.

Beach Townsite, showing mill, bunkers and store.



The Mill.—Produces about 1,500,000 lbs. of copper per month. Runs 24 hours daily.

Ore Bunker Company steamer "Quadra" loading.

Gold

Address by Nt. H. N. Lawrie, Chairman of the Bureau of Mines, Oregon.

He said:—

We all know that the economic situation has been changed very rapidly from time to time and it is very hard to keep track of these changes which are very momentous and very serious bearing upon our present and immediate future. To start with I have prepared some charts and data. The year 1915 is the high point in the production of the world's gold which was 469 millions. The decline has been very rapid since. I propose to give you the percentages of decline in the past three years with respect to the production of 1915.

The total decline for the world's production represents 20 per cent. The decline for South Africa was only six and four-tenths per cent. The fact that the decline was no much less than the decline of the world is evidence of the fact that South Africa happened to be more remote from the centre of economic pressure. They had probably laid in their supplies in advance. Another factor is the improvement in the recovery of returns in the South African ores and that has tended to compensate for the economic conditions that have been so universal in the gold mining industry.

In Australia a country which was no less remote but on account of the fact that probably the resources of the Australian gold mines were diminishing we have a continuous decline from 1912, but the decline from 1915 represents 45 and a half per cent. The decline in Canada is 6 per cent. covering a period of three years. British India, the decline is 13 per cent., Rhodesia is 15 and eight-tenths per cent. and other colonies the total decline amounted to 46 millions and represents 15 and four-tenths per cent.

In the U. S. we find the decline to be 32 and two-tenths per cent. Of the total decline of 92 millions of the world's gold production, the production of the U. S. may be accounted a decline of a little better than one-third or approximately 35 per cent. while the U. S. gold mines produce one-fifth of the gold output. That denotes the extreme economic pressure and reflects the volume of the financial responsibility of the development of the natural resources and the responsibility of the U. S. when it entered the war. It was much more acute than it was in some other countries that had felt the pressure before that time.

In Russia we naturally expect that country would show the effect of disorganised government and so it does. The Russian decline is 62 per cent. for the three years and I suppose that spells more eloquently than anything else the effects of Bolshevism. The south and central American states showed an increase of five and three-tenths per cent. and I assume some of that increase has been made up from the by-products of gold. The Mexican crisis in gold production took place in 1915. It happened to coincide with the year in which the high point took place and speaks for the chaos in which the Mexican governement found itself at the initiation of their difficiulties. The production was a little over six millions and in three years it has increased to ten millions so that we have an increase in Mexico of 52 per cent.

All the other countries combined indicate a decline of 4 and two-tenths per cent. To analyse the situation in the U. S. a little more carefully, I have prepared a chart on exactly the same principle and covering the same years from 1912 to 1918. We find that California has just about maintained its production in a somewhat similar manner that South Africa maintained its production with respect to the world notwithstanding the fact that the economic pressure was so severe and showed such a decline in the other states. It is probably for the reason that a considerable part of the output in California is placer mining where labor is not so much a point in the cost of production. Then the interior states had difficulty in holding the seaboard. The decline in California is 23.7 per cent.

In Colorado we find a decline of 45 per cent. This is due to the labor situation and the complexity of the treatment of ores where the chemicals advanced so rapidly. In Alaska we have a decline of 45 and a half per cent. which corresponds exactly with the decline of Australia and it can be accounted for, not altogether by the economic pressure because you will recall the closing down of the Treadwell which was an important factor in the contributing to the Alaska production. Nevertheless the decline since 1917 shows the tremendous effect the war had on the Alaska production.

In Nevada we have a decline of 44 per cent. due largely to the treatment of their complex ores and the fact that they are located away from the coast. In South Dakota we have the Homestake mine which is so well developed and is such a homogeneous ore that they were able without difficulty to maintain their output in fairly good shape. Their decline is only eight and three-tenths per cent. In Arizona the copper production extended very rapidly in the last three years and that expansion gave an expansion in their gold output of 26 and four-tenths per cent. In Montana we have a decline of 36 per cent. and in all the south states and dependencies combined of the U. S. we have a loss of 33.4 per cent. That corresponds with the general loss for the entire U. S.

This third chart is an attempt to show a combination of factors which enters into the stress of the decline in the gold production throughout the world. In 1912 the Hypothetical gold mine yielded $12 per ton and the total cost of production was $7. You get the cost per ounce of production of $11.70 with a profit of $8.30 per ounce. I have assumed the price of gold at £20. Here is a condition and that is the depreciating value of the ore at depth and the increased cost of production and these two factors would give, regardless of any economic pressure that would be brought to bear. So that in this year of 1913 we have a recovery of $11 per ton at a cost of $7.50 per ton. In this case we had a production cost of per ounce of $13.60 while the net saving was $6.40 per ounce. These two factors combined gave a return of $10 per ton and a cost of recovery of 8 and a half dollars combined to produice the cost at $16 per ounce with a profit of $4 per ounce.

It was apparent at this time the management prior to 1915 decided that they were creating very rapidly an economic limit and while they had been operating on a 3,000 ton basis per month they estimated that they should be able to reduce their cost by multiplying their output. They did that and we have a decline which shows a result from that policy. 1915 with a double output we have a recovery of $9 per ton at a cost of $7 per ton for the total cost of recovery which make the cost per ounce $15.60 with a profit of $4.40.

From that time we have this other component to deal with this economic pressure this decline in the purchasing power of the dollar which was due to the fact that we were pressed to obtain war materials at a very rapid rate and the consequent currency inflation in the open market and the credit expansion that was bound to take place which it did and, according to the best economic theory when they increased the currency and expanded the credit we were bound to come to a reaction in the commodity prices. From here on the economic pressure is rapid and in 1916 we find the gold ounce was $17.60 with a profit of $2.40. In that year the recovery was eight and a half dollars and the cost increased fifty cents to $7 and a half dollars.

In 1917 we find a continuation of that. We recovered the same amount per ton and the total cost had risen fifty cents making it eight dollars per ton and the total cost per ounce was $18.80 with a profit of $1.20. In June 1918 the total cost of recovery was eight dollars per ton and the total cost of recovery was $10 provided the mine continued operations. Many properties did shut down which was wise business policy. Here we get a total cost of $25 per ounce which would have made a net loss of $5 per ounce and when in 1918 we have $30 per ounce cost of production which would have made a loss of $10.

This last chart shows the ebb and flow of the gold imports and exports from and to the U.S. from the fiscal years 1913-14. They always end on June 30. In 1914-15 we came out of the negative conditions, we were in in 1913-14 and 1914-15. This would have been considerably greater in favor of our balance of gold in favor of the U.S. had it not been for the fact that all our foreign securities were liquidated against the trade balance; that was in our favor at the time and this probably continued somewhere between 1915 and 1916 and after they were liquidated. Of course the gold rapidly flowed into the treasury and it may be said that much of this gold represented, belonged to neutrals who remained neutral during the entire period. Of coures this enabled the U.S. to enter on a financial offensive regardless whether the neutrals were willing or not.

In 1916-17 this gold import amounted to nearly one billion dollars. Of course our exports of gold in the same year brings the amount down considerably. I want to particularly point to the fact that from June 30, 1917, you will note the very rapid decline that took place in the movement of gold. In fact we developed a balance against us in actual gold of 66 millions in 1917-18 and since that time the gold movement has been practically negligible. It has been marking time.

It can be readily seen that the U.S. by liquidating its obligations in foreign countries by having thris gold reserve in custody, has become more or less a creditor of nation. And it is very important that the world be informed as to what attitude the U.S. may be expected to assume because of this tremendous responsibility that has been thrust upon her by the war. But before going into the matter of international trade and commerce I would like to call attention to a condition which now exists which is based altogether upon a league of nations as to what we may expect to have in the way of commodity prices in the next two years.

Some persons have it figured out that those prices are bound to drop, and they are waiting to see what the trend of those prices will be before they expand and go into production. The aggregate of this when translated into terms of production was that it has created a condition of stagnation which is just as artificial in its conception as the tremendous gains that has been made in commodity prices due their action of economic barriers. Had we at this moment concluded our period of readjustment and new construction, we might expect to be able to contract the currency but we have not yet reached that period and we have got to expand our currency in order to meet that exigency.

Temporally while we are marking time waiting for the peace treaty to be adopted the door of international commerce has been closed. Commodity prices in this country have dropped slightly but they are bound to increase because of the fact that we have to expand our currency and extend our credit and it is good policy that that extension should take place because we have very many vital problems to deal with in this period.

In response to those gentlemen who are waiting, in response to the municipalities which are waiting, in response to the provinces and states that are waiting, to them it seems conservative to wait, but let us see what will result from that watchful waiting policy.

With the signing of the peace treaty there will be a tremendous demand for the delivery of a great variety of commodities to the Europtan countries and those gentlement who have waited will find themselves in the same market with this great demand to obtain delivery of their equipment. Aside from the delay they will have passed through the period of two years in which we are going to have these high commodity prices which will enable them to recoup what little excess of prices now exists bya period of production for those two years and they will be in the market to obtain delivery of this material and I doubt very much whether the domestic demand will be delivered first. Why should it be. These countries are entering upon a period of reconstruction that is altogether vital to their existence and they should have the first command of this material and we should certainly be prepared to place our order during this period when the demand may be made.

This condition reminds me of the fact that generally speaking industrially we are marking time at a time when we should be going over the top. The boys in France were not called upon to mark time. They were called upon to go over the top and they are returning better citizens and more capable men to assume the responsibilities of our new constructive industrial life. They do not want to take part in this marking time at home. They are not looking for charity. They are not looking for anything but an opportunity to enter upon a most progressive programme and why not. They have seen too much of activity to settle down and and keep settling down.

Among the various developments that could be made, the mining industry is one of the best for these men to participate in. In times of peace the mining wage has always been the top notch wage. There is not a cleaner business and there is not a business in which they can change with more enjoyment because of its outdoor life in the mining industry, and I believe this convention is well timed and that it will have a most marked effect in accomplishing this result and to the people of B. C. is due the credit for having seen the necesity for allocating the mining industry in the general progressive development of our industrial programme.

Now I should be very frank in stating this, because I believe this is no time to withold the truth. This is no time to camouflage the situation. Our future depends largely on our conception of the truth and our actions in accordance with it. In the matter of international trade I have said the U. S. has become a creditor nation. The U. S. has always been a nation which has seemed full of self interest. I do not wish to convey the idea that there is anything philanthropic that the economists and financiers have in the U. S. concerning the future because that would be camouflage.

But I want to call your attention to the breadth of vision these gentlemen have. We have our goods bought and we are enabled to get them home and we have got to do certain things. We have to educate our people and you in Canada have to educate yours for the necessity of absorbing foreign investment in Canada and the U. S. Why. Because the foreign countries with whom we desire to trade have not the gold to deliver. They have not the goods to deliver because their industries are paralysed and the trade balance is against them.

To draw on their currency would cripple them internally. With what will they pay. They have nothing with which to pay until a broad policy has been developed to absorb the securities of these countries in order to offset that balance. The great variation in commodity prices in the U. S. has been largely due to the erection of economic barriers. Price taxation by government is always an artifice. It met the requirements of the war but it does not meet the requirements of peace. We have to eliminate those artificial barriers. Let the good old immutable law of supply and demand govern the situation. We have been a long time with it and it has never proven false.

During the period the barriers have been erected domestically and in a large measure these barriers have been erected internationally, what has been the result? The U. S. put an embargo on gold and they have been paying a premium of 7 per cent. to get a draft to Buenos Aires. Of course the Canadians know they have been paying 2 per cent. on account of the fact that they put an embargo on gold and it simply represents a physical difficulty in making an exchange. We have got to have more money for development and I am wondering whether it might not be prudent to consider whether the inflow of capital would not greatly offset the advantages of maintaining such an embargo. And this argument applies to every country and it is to the future course of trade. I hesitate to use the word freedom of trade because I might be misunderstood, but I mean that condition of trade which imposes a burden upon the free transportation of products between any two countries in the world.

It is alarming to consider what some of those exchange rate have been and are now. Roberts says it has been necessary to pay as high as 50 per cent in Spain and in Italy it has been necessary to pay a premium of 100 per cent. In Paris it goes to 5 per cent. to get a draft to New York and sometimes as high as 10 per cent. In London a New York draft costs 2 per cent. but it has taken steady lending by this country for the last three years to hold it down to that point. It is also due to the fact that there was 62 per cent of the world's gold output inside the British Empire.

The first condition that is going to assist the gold mining is this freedom of trade which is a most important thing, the resumption of a sound financial basis of trade with foreign countries. We know the demand is there. Those gentlemen who are holding copper at the present time even operating extensive margins in order to hold it but these supplies are necessary.

The effect of putting gold on the open market would be to give the old miner what he justly should have and I may remand you of the fact that while other metals have dropped gold has been keeping at the constant level. That is a very excellent omen. Some people have been so anticipatory of this condition as to say there will not be gold enough. We know that most of the nations are on that basis and the others will be forced to it. They will have to speak in the same language as we have and they will have to adopt the same vocabulary. The British pound sterling has won for Britain the commerce of the world in the past. It has spoken very eloquently of the sound finance that was back of it and the promise to pay is going to be supplanted by no substitute. Why should it be? It has taken us a century and seven years to win for that piece of paper its hundred per cent. value and is based on gold at a fixed price of 23.22 grains per dollar in terms of the currency of the U. S.

So that I find in analysing the various statements that have come from economists that those who believe that our debts are to be repudiated and our standard changed are very far from the fact. We have got to hold the ship to the shore. So far as I can see the extension of Bolshevism is one of the menaces we are confronted with and this marking time on new investments is not putting a backfire on Bolshevism. The best backfire to Bolshevism is to create a condition of employment that is universal, to create a margin of profit which represents a good living for labor and those fellows will have the wind taken out of their sales. They are operating on a draft that is being blown by their own bellows and it does not get anywhere. Even in their ranks the radical of today is the conservative of to-morrow. It is amusing to see the transition when one of them is elevated to be ruler over them. He immediateily develops that ultra-conservatism that we perchance would not dare to assume.

MANAGEMENT OF CONVENTION.

The British Columbia Chamber of Mines, through its Executive committee undertook and carried out all arrangements for the entire three day's program and to the executive and committees the entire unqualified success of the Convention is credited. Every man on the executives and committees and others who assisted carried on day and night during the entire three days. The executive committee consisted of the following:

Mr. A. M. Whiteside, Mr. J. M. Lay, Dr. E. D. Hodge, Mr. H. P. McCraney, Mr. Nicol Thompson, Alderman F. E. Woodside, Mr. J. D. Kearns.

Committees.

Manager of Convention, Mr. J. D. Kearns; Program, Dr. E. D. Hodge, Chairman; Machinery Exhibit, Mr. S. J. Crocker, Chairman; Mineral exhibit, Mr. Kenneth S. Robinson, Chairman; Trip, Mr. I. Thomas; Hotel, Mr. A. H. Wallbridge; Resolutions, J. E. Thompson, M. P. P.; Publicity Director, Mr. T. J. McIlveen.

It must not be forgotten that Mrs. A. M. Whiteside and Mr. J. M. Lay did a lot of hard work in entertaining the visiting ladies who were present, and the Chamber of Mines is indebted to these ladies and their assistants for taking care of this part of the programme.

Mineral Exhibit

International Mining Convention Held at Vancouver, March 17, 18, 19.

By EDWIN T. HODGE, M.A., Ph.D., Prof. of Geology and Minerology, University of British Columbia.

A feature which attracted a great deal of attention at the International Mining Convention was the exhibit of minerals. Visitors were deeply impressed with the siez of the exhibit, the great range of minerals displayed and the evidence it gave of the mineralization of the entire Province. Many complimentary remarks were made by visitors who agreed that it was the largest and finest display of minerals ever gotten up in Northwest and many went so far as to say that it compared with the exhibit at the San Francisco Fair.

There is much discussion now in the local papers and among business men to the effect that British Columbia should prepare exhibits of this character and send them to all parts of the world. Especially should one be placed in the British Columbia House in London, England, and in New York City. The B.C. Chamber of Mines is in daily receipt of letters from Japan, China and various points of the United States which request exhibits of our minerals for display in Chambers of Commerce and other places. It would seem from this that British Columbia can do much to attract investors by a proper display of her wares in centres of foreign capital.

The display of minerals brought out very forcibly several ideas. One of these is that British Columbia is above everything else, a mineral Province. No part of it is without mineralization of some sort. Prospects abound everywhere. In fact, I do not believe there is any part of the world which contains, for the area explored, so many prospects. Almost every part of the Province that has been examined has shown mineral developed in a greater or less degree. This is in striking contrast to many other mining areas where prospecting has to be continued for a long period of time before even an area of mineralization is found. This prodigality on the part of nature in giving to British Columbia so thorough a mineralization is perhaps the very reason why such prospects of mineral deposits as are found do not receive the intensive development that they receive in other parts of the world.

Most of the minerals displayed in the exhibit were from prospects, few of which have received any thorough developmental work. One cannot help but be reminded of the fact that almost all of the big mines existing in British Columbia at the present time were, at one time, prospects with no better showings than those whose ores were exhibited at the Convention. The only difference, as far as the writer can see, is that the prospects, which developed into big mines, received intensive, persistent and long continued exploration work, frequently in the face of discouraging results until finally results of a substantial character were produced. As stated above, in other parts of the world, where mineralization is not so universal, a prospect, when once found, is at once developed and this development work continues until the prospect is either proven only a prospect or developed into a mine. Here in British Columbia the prospector or the prospect owner rarely proceed to active development work. The percentage of prospects properly developed in a thorough manner, which have developed into mines, is large. Very few failures due to a real lack of ore are recorded. The difficulty has always been one of getting our prospects thoroughly examined rather than lack of ores of intensive mineralization. This fact should make one look with favor upon many of the mineral occurrences. This is especially true when one considers that the Province, as a mining community, is only a few years old and that of the $126,000,000 invested in mining enterprises over $64,000,000 at this early date has been returned.

To the geologist these facts are not at all surprising. In no part of North America are the geological features which favor mineralization so highly developed. British Columbia contains thick series of sedimentary rock which have been penetrated time and time again by large and small intrusive masses of mineral bearing igneous rock. A study of the geological map of North America will show that mining areas are definitely related to areas of sedimentary rock cut by igneous rock and this examination will further show that British Columbia contains this particular feature to a degree greatly surpassing that of any other portion of North America.

That British Columbia is an area of so extensive and intensive mineralization is not generally known. There seems to have been a conspiracy of silence regarding British Columbia's mineral possibilities. This conspiracy of silence has persisted even up until the last few years. Of the large mining companies in British Columbia, all of them, with one or two exceptions, can count their history in the Province for only a few years back. Another striking fact is the very limited number of investors in mining in British Columbia. As the area for prospecting is becoming smaller and smaller with the passing of time and mining investors are beginning to look to the farthest ends of the earth for mineral it is beginning to look to the farthest ends of the earth for is surprising that an area containing such attractive ores as were shown at the mineral exhibit should have lain unnoticed, undeveloped and unadvertised for so long a period of time. Now, however, the mineral wealth horded in the mountains of British Columbia is beginning to be recognized. Evidence is at hand that many of the large mining companies in the United States are looking to British Columbia with a great deal of interest, and we may confidently expect to see a real BOOM in mining development during the next ten years.

The ores represented in the exhibit came from areas more or less isolated and in great need of means of transportation. The present policy of the British Columbia Government to build trails, waggon and railroads is highly to be commended. The development of means of communication will perhaps do more to stimulate mining than any other one thing. Another fact brought out by the exhibit is that coal is British Columbia's most important mineral.

Canada contains one million two hundred thousand million tons of coal, or more coal than all the rest of the British Empire put together. Of this large amount of coal, British Columbia contains more than half and, furthermore, the coals of British Columbia are of much higher grade than those of the rest of Canada. The coals of British Columbia, as shown by the exhibit, range from lignites to anthracites. In fact British Columbia contains in the Ground Hog field the only anthracite known in Canada. Lignite coals are rare. Most of the coals in British Columbia are bituminous in character. In these days when coal is looked upon as something more than a fuel, when we are considering ways and means of utilizing all of the by-products of coal, we must look with great favor upon any coal which will

provide a high grade coke and a large percentage of by-products. British Columbia, apparently, judging from the exhibit is rich in such coals. At the present time only two coal-fields in British Columbia are used in the manufacture of coke, the Fernie coals and some of the Vancouver Island coals. This appears to be a very regrettable fact. There seems to be no good reason why many of the coals, if properly handled, could not be used to make a high grade of metallurgical coke. This is particularly true of the Vancouver Island coals. The law that iron ore always goes to coal still holds true. It is desirable, therefore, that the iron go by the shortest and cheapest route.

The Coast area of British Columbia contains abundant iron, and if a good metallurgical coke can be made from the Vancouver Island coals then the movement of these iron ores to the coals would be easily accomplished by water transportation. Coal may be looked upon as the greatest resource in British Columbia and the one upon which our great industrial future must surely depend.

However, British Columbia is not limited to one mineral, as was evidenced by the large display of copper minerals. British Columbia now possesses the three largest copper mines of the British Empire. One only has to go back a few years to the time that the copper output of British Columbia was almost negligible. The present large copper deposits then were only prospects and not extremely attractive ones either. There exists in British Columbia at the present time a great many prospects as attractive as were the prospects of Hidden Creek, Britannia and Copper Mountain a few years back. If capital could only be encouraged to explore some of these more attractive prospects, there is no doubt that many large mines would be developed. The ore exhibited illustrated the fact that chalcopyrite is the fundamental copper mineral of British Columbia. It seems to occur all over the Province. Very attractive specimens show that this mineral occur abundantly at such widely separated places as Princeton, Trout Lake, Hazelton, Kamloops, Lillooet, Queen Charlotte Island, the Skeena, Bear River and many other localities. Much of the chalcopyrite exhibited was associated with pyrrhotite as at Rossland, Kingston, Mammoth Valley and along the Coast and particularly upon Vancouver Island. Chalcopyrite associated with pyrite is a characteristic association at the two largest copper mines, Hidden Creek and Britannia. Much of the chalcopyrite is rich in gold as is illustrated by the specimens from Copper Mountain, Britannia; Voights Claim, Black River, Lillooet; Bear Creek, Tulameen and Calapo Group at Clayquot. Some of the chalcopyrite contains platinum as illustrated by the specimens from Grand Forks. Secondary copper minerals are generally considered to be lacking in this province. In fact a few years back our mining journals were filled with discussion attempting to prove that British Columbia could not be expected to contain copper ores derived by secondary enrichment. Even to-day learned engineers solemnly shake their heads when one mentions prespect of secondarily enriched minerals in British Columbia. The exhibit showed that the dry belt of British Columbia abounds in occurrences of secondary copper mineraliaztion. The dry belt has always been looked upon with disfavor by mining men, chiefly because of this type of mineralization. That all secondary occurances of copper mineral are not necessarily small and sporatic has been definitely proven by the exploration work carried on at Copper Mountain, Princeton. Why is it not reasonable to think that many other deposits of secondary copper mineralization may not prove to be as large as the one proven at Copper Mountain?

Many ores were on exhibit containing minerals of the bornite and chalcocite association. The following illustrations of this type of ore may be cited: Drum Lummon, The Grafter, Whitehorse; Emma, Discoverer, and Copper-Kid of the Skeena; Silver Kind and Hamilton Fraction in the Slocan; Nesbitt and Archie at Portland Canal; White Rock at Kamloops and other places. No doubt some of these are ores derived by secondary alteration of primary ores, but the writer thinks that a few of these are ores deposited directly from magmatic solutions, and for that reason offer an attractive inducement for exploration. Many ores of the chalcocite and bornite association are rich in silver as those of the Drum Lummon, the Seniorita at Trout Lake and several specimens from the Omineca Mining District. Native copper specimens were on exhibit from two prospects, the Aberdeen and Oregon Group, both of the dry belt.

The statement is commonly made that copper mining in British Columbia is a pursuit open only to very wealthy mining corporations. This is obviously not true. Transportation and smelter facilities permitting, many of these silver and copper rich ores could be mined in a small way and be made to pay.

The mineral exhibit perhaps proved that, of the metallic minerals, copper is going to be the most important one of the Province, but it can never greatly exceed the silver lead minerals in value. Excellent specimens of this type were displayed from the Slocan, Hazelton, Portland Canal, Alice Arm, all along the Grand Trunk Railway, and in the Omineca District. Even parts of British Columbia usually stated not to be highly mineralized sent in very fine specimens of argenliferous galena from the Ainsworth, Windermere, Couverapee, Lardau, Ymir and other places of the Rocky Mountain Terrane. Specimens from the Monarch Mine at Field reminded us that some of these deposits could be mined and yield handsome profits. Some of these silver bearing galena ores are associated with sphalerite which, at the present state of our metallurgical skill makes them unattractive. However, metallurgy and ore dressing has in the past made very rapid progress and ores which a few years ago were considered useless to-day command premium prices. Perhaps some of these zinc rich galena ores will not have to wait long before they occupy a similar position of favor. The ores from the Sullivan Mine at Ainsworth teaches what may be expected from some of these sphalerite prospects.

Next to coal, iron is the next mineral of fundamental importance. In fact, a geographical unit devoid of iron ores would be economically helpless if placed beyond the assistance of her iron rich neighbors, as by war, for instance. For this reason the development of the iron industry in any country should be looked upon as one worth a great deal of Governmental assistance. Iron ore deposits, like railroads, should not necessarily be developed with the expectation of dividends, but in order to make possible other industries whose profits will, to the Government, more than compensate the loss incurred through the development of the iron mine. British Columbia stands in a position to furnish to the Orient a large number of iron fabricated mechanical devices providing these devices are manufactured on the Pacific Coast. The manufacture of all of these is dependent

upon the supply of iron. Therefore it behooves our Government to make the most of its iron deposits. British Columbia has no good excuse for not developing a large iron and steel industry. Coal capable of making good coke abounds, and the mineral exhibit shows that iron ores occur in many places. Every few miles along the Coast a deposit of magnetite exists. These deposits are of a type which, under similar conditions in some other places, have been proven to contain large tonnages, and in several cases have been proven to contain many million tons of ore. In fact, there is enough of this magnetite ore in sight on the Coast of British Columbia to keep a blast furnace of several hundred tons capacity in continuous daily operation. Magnetite ores occur not only along the Coast, but specimens were on exhibit from the Arrow Lakes, and from the vicinity of Kamloops. Magnetite practically is the chief iron ore of British Columbia, but hematite ores also occur as at Tatla, Clinton, Bull River, Y.T.; Kitchener of the Chilcotin; the Bear River and Portland Canal. Limonite ores were exhibited from the Standard near Hazelton, from Mons at Alta Lake and the Portland Canal, from Chilliwack Lake and from the Rainbow Claims near Hope. Gossan limonite ores were exhibited from Sheep Creek, the Mother Lode and Bitter Creek near Stewart, B.C. Specular hematite ores from Princeton and Nicola were shown. Not only did the exhibit indicate that British Columbia possesses many iron ore occurrences, but it also proved that those minerals needed to make the important ferro alloys. We may confidently look forward to the time that the Province will be producing along with the iron and steel all of the ferro alloys needed in the steel industry. For example, Tungstein in the form of Wolframite from the deposits in the Atlin district, and Sheelite from the Van Winkle claims in the Cariboo was exhibited. Chromite ores occur in many parts of southern British Columbia, as at Cascade, Olivine Mountain and in the vicinity of Ashcroft. Excellent specimens of molybdenite were on exhibit from Alice Arm Corrundum Claims at Skeena; Lost Creek at Nelson; Timothy Mountain, Cariboo; Bald Mountain on the North Thompson and Texas Creek in the Lilloot. Rich manganese minerals were on exhibit from Kaslo and especially from Cowichan Lake, Vancouver Island. Specimens of high grade magnesite were on exhibit from the enormous deposits in the vicinity of Clinton.

Right now, while copper seems to be temporarily without a strong market, gold ores are receiving much attention, as evidenced by the large number in the exhibit. Like the iron ore prospect, the gold prospect deserves a great deal of encouragement, especially now, when our highly inflated credits must sooner or later be liquidated by real gold if we are to preserve the Dominion credit. One of the striking things brought up by the mineral exhibit was the low state to which gold placer mining had fallen in British Columbia. Only a few samples of gold sand and nuggets from the Cariboo were on display.

When one compares the geological similarities existing between the Cariboo and Australia or Tasmania, one cannot help thinking that these placer deposits will sooner or later lead to important lode deposits which will, when developed, far surpass the placer deposits in yield. In other parts of British Columbia lode gold ores are developed as at Surf Inlet, Engineer Mine and the deposits of Bridge River. One of the most interesting specimens of the exhibit was the specimen of the new ore recently developed at Rossland, which carries as much as $2,000 per ton. This ore seems to occur in large quantities, and the probabilities are that Rossland will soon again become a very active camp.

The above is a discussion of major minerals, but many of the so called minor minerals were on exhibit. Among these minor minerals may be mentioned some of the following: Arsenopyrite ores at Hedly, muscovite specimens from the Clearwater country and from Tete Jaune Cache; stibnite ore from the Alps Alturas of the Slocan, and rich silver bearing ores from the Mary Reynolds Mine, salt and sodium carbonate minerals from the Clinton district, diatomaceous earth from Atlin and from the vicinity of Nicola; beautiful specimens of fluorite from Grand Forks; specimens of strontianite from the Daffodil Claims in the Lardau, and from claims near Princeton; Gypsum from many parts of the Province; cinnabar from Field and Kamloops; platinum from the Cariboo and from Olevin Mountain. One should not leave this discussion without mentioning the exhibit of oils. Two sets of samples were displayed, one from the Southeast Kootenay and one of seepage oil obtained from the vicinity of Vancouver.

It will be seen from the above that the mineral exhibit of the International Mining Convention stamped British Columbia as a Province containing a large number of mineralized areas. It proved that the mineralization is not only, as is often stated, of low grade disseminated ores, but at places occur very rich concentrated ores, and it further proved that the mineral prospects of the Province are not confined to one or two types of minerals, but contain almost the entire gamut of mineralization.

SLEEPING QUARTERS.

The Alaska B. C. Bedding Co., Ltd., manufacture a most sanitary line of camp springs, camp beds, and camp mattresses. As these are manufactured in the same factory as the celebrated Ostermoor mattress, you may be sure that for strength and durability they are not to be surpassed.

THE B. C. CHAMBER OF MINES.

Every man in any way connected with the mining industry in the Province of British Columbia, whether he is a resident of the Province or not, should become a member of this organization. The executive of this organization planned and carried out the most successful mining convention ever held on the American Continent, and as this was of an International nature, this success is more to the credit of this live organization than if it had not been of the nature of an International gathering of men most prominent in the mining industry.

To make their work more lasting, and to further the interests of the mining industry of British Columbia, the B. C. Chamber of Mines ask all who are interested in advancing the interests of the Province to become a member of this organization. The annual membership fee is $5.00.

Information and answers to all queries will be gladly furnished, by the Secretary. Address all communications to the B. C. Chamber of Mines, Dominion Bldg., Vancouver, B.C., Canada.

by the various States. This arrangement may seem idealistic and impractical, and it is offered here largely for the purpose of causing reflection and argument, but at the same time, unless the mining industry can put into effect a system that will be fair both to employer and employee, and that will prevent obviously unfit men from working underground, it will be almost useless to make any other effort toward prevention of illness among employees. I believe that the time has come for the American Institute of Mining Engineers to consider seriously the necessity and the means of carrying out physical examinations and to take a definite stand.

The second requisite for the prevention of illness among employees is the maintenance of working conditions underground on a high plane of sanitation and efficiency so that illness arising from working conditions may be held to a decent minimum. The greatest need in the improvement of underground conditions is the elimination of dry drilling in hard-rock mines. The relationship between hard-rock dust and miners' consumption has been so clearly demonstrated that it is not subject to argument; suffice it to say that the efforts made in England and in British colonial possessions to deal with this evil have shown the possibilities of abating it, while in this country little has been attempted. As long as dry drilling is permitted in hard-rock mines, just so long will we have an inordinate amount of pulmonary disease among the miners. That this has worked an economic hardship on the industry, aside from its humanitarian features, and that it has been one of the causes of the better grades of mine labor leaving the industry, is apparent to any one familiar with the conditions, and it is hard to understand why the subject of dry drilling has received so little attention in this country. Dry-drilling apparatus may be as deadly as a machine gun, if somewhat slower, and its continued use in the mining industry is a matter of reproach. While it may be true that the water varieties are not as satisfactory as they might be, at least their improvement should receive serious consideration. It is incredible that American ingenuity, which has produced the telephone, the telegraph, and the flying machine, should be unable to cope with the production of a water drill that would largely make impossible miners' consumption.

Conditions of ventilation and temperature underground are not what they should be, and have never received the attention in metal mines that they have in coal mines. This is also a matter of prime economic importance because a greater amount of work can be done under conditions of proper ventilation and temperature than when there is poor ventilation and high temperature. While the latter may not cause specific illness, certainly they lower the vitality, lessen working ability, and predispose to many illnesses; if we are to have healthy miners we must so arrange it that they can work in places properly ventilated and not excessively hot. Mine ventilation is too complex a subject to be considered here, but the use of small fans with canvas tubing seems to offer a satisfactory and economical means of improving ventilation.

Proper toilet facilities underground are important as a health measure, but vary so much according to the size and locality of the mine that they need not be gone into in detail here; besides, their principles are well understood.

PREVENTION OF ILLNESS AMONG EMPLOYEES IN MINES.

By A. J. LANZA.*

(A paper presented at New York Meeting American Institute of Mining Engineers, February, 1919.)

The prevention of illness among the employees of the mining industry is especially important in view of the importance of the industry, the unsettled conditions of labor, which emphasize the economic necessity for conservation of labor, and for humanitarian reasons. The burden of chronic illness is altogether unwarranted and unnecessary. If the industry is to maintain its labor supply in an efficient manner and keep the standard high, it is essential that it make every effort to keep its labor in good physical condition.

The basis principles underlying health conservation are the same for any industry, but they are here applied, especially to the mining industry, and more particularly, perhaps, to metal mining, as it is with this phase of the industry that the writer is most familiar, and as it is conceded that metal mining presents more health hazards than coal mining.

The first step in the prevention of illness lies in securing employees who are in sound health and free from organic disease. I do not mean that all men who go underground should be physically perfect, but they should be free from organic defects of the heart, lungs, and other organs, or from anatomical defects that would markedly increase their liability to accident. The number of men working underground in mines in this country whose physical condition totally unfits them for such work presents a situation that should not be allowed to continue, and which I believe is not equalled in any other industry in the country. There is but one way to secure men who come up to the required standard, and that is by a thorough physical examination before employment. I am fully aware of the objections felt toward such a procedure by many employers and employees. There is much to be said on both sides, but to any one who is at all familiar with the mining industry as it is today in this country, and who approaches the matter with an unbiased mind, there can be absolutely no doubt as to the necessity for physical examination. As a purely logical proposition this is self-evident, but there remains the further necessity of placing physical examinations on such a basis that they can be administered in a just and equitable manner free from the abuses and suspicions to which they have been subject in the past.

The best way of administering physical examinations in the mining industry would be to have them conducted by properly constituted authorities of the various States. That is, if John Jones wished to work as a miner, when he appeared at the employment office of the Smith Mining Co., he would have in his possession a certificate from the State authorities declaring him to be free from organic or other defects that should, in the natural order of events, bar him from underground work. Such a system would presuppose reciprocity among the mining States and a basic standard of physical fitness. It would be well within the province of the Federal Government to establish such a standard for adoption

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The third requisite consists of adequate provision for medical and surgical service so that minor illnesses and injuries may be promptly treated and not become of major importance. In regard to accidents, "safety first" has become highly specialized and efficient; health service, if I may use this term, has not been developed to the same proportion. While many of the larger mining companies maintain first-class hospitals, the prevention of sickness among miners has not kept pace with the prevention of injury. It is just as feasible to distribute posters and other educational matter dealing with the proper care of common colds, constipation, and other minor troubles, which are forerunners of serious ailments, as it is to impress on the miners the necessity of having the smallest injury promptly attended to by the company doctor. There is need for a closer co-operation between the doctors and the miners in handling the minor ailments when they first apepar. In former days the miner was an English-speaking person with all the advantages of a knowledge of the country and its institutions; at present underground workers are largely foreigners, and the employer must provide for their health during working hours, and often in their homes if he desires to keep them on the job.

It is probable that the mining industry will always be hazardous to health and life as compared with other industries, but at present it is needlessly so, because the wastage of human material can be prevented by securing physically fit labor, and by keeping its health unimpaired.

BRITISH COLUMBIA COAL PRODUCTION.

The production of the collieries of Vancouver Island for the month of February totalled 145,750 tons in comparison with 158,327 tons for the month of January. It should be borne in mind, however, that February is the shorter month. Still this does not altogether account for the decline. Nanoose Collieries, for instance, dropped to an output of 500 tons which is explained by the interference with work caused by the work of constructing a wharf. While the generally changed conditions of the past six months have had no very noticeable effect on the Island Collieries as yet, the producing mines being operated steadily and in most cases to capacity with results even better than when the war demand was at its heighth, there are slight indications that the urgency for output is not as great as it was. The work of opening up the Wakesiah Mine, which is situated near Nanaimo, B. C., and owned by the Canadian Western Fuel Company, has ceased temporarily and a short time ago the coal miners of Nanaimo were off for a Saturday afternoon.

Details of the production of the Island Collieries for February follow:

	Tons.
Canadian Western Fuel Company	59,104
Canadian Collieries (D) Ltd.	19,531
" " " " (Comox)	50,691
" " " " (South Wellington)	5,566
Pacific Coast Coal Mines (Morden)	4,719
B. C. Coal Mining Co. (Jingle Pot)	2,748
Nanoose Colileries	500
Granby Consolidated Mng. & Smelting Co. (Cassidy's)	2,891
	145,750

Of the above the collieries which show increases are the Pacific Coast Coal Mines, Ltd., and the Granby Consolidated Mininfi & Smelting Company. The Nanoose Collieries operated for five days only.

Details of the production for February in the Nicola-Princeton District follow:

	Tons.
Middlesboro Collieries Co., Ltd. (Merritt, B. C.)	3,935
Fleming Coal Company	3,729
Coalmont Colliery	800
Princeton Collieries	2,051

Both the Princeton Collieries and the Coalmont Collieries have increased their production in comparison with the results of aJnuary. In the case of Princeton the explanation of the improvement is that in the previous month a fire interfered with work.

As for the Crowsnest Pass Coal Field, there are no returns to hand as yet. The collieries, however, are authentically said to have operated only twelve days. A substantial reduction, therefore, is looked for. The reason for this slackness is found in the lack of demand in British Columbia for coke, following the closing down of the smelteries at Greenwood and at Anyox, particularly that of the Granby Consolidated Mining & Smelting Company at the latter place where a large quantity of the fuel is used when the plant is working to full capacity.

"By bringing the coal mining companies under the alternative of income tax or mineral tax, in common with other mining companies, we can hope for a revenue of $200,000 instead of the $160,000 estimated for the last year."

This statement was made by the Hon. John Hart, Minister of Finance in the British Columbia Government, when making his budget speech before the Provincial Legislature a few days ago. It is of special interest to the coal operators of the Province as it intimates the policy on which the Government has determined relative to the taxation of the coal mining industry. From the sense of the statement it is concluded that the report tha a straigh increase was to be made in the tax per ton of coal produced is without foundation, which will be a relief to these connected with the coal mining companies.

In explanation it may be said that the tax the companies now pay is 10 cents a ton. Returns of coal produced are made to the Government at regular intervals accompanied by taxation payments on the basis shown. Under the amendment which the budget speech of the Minister of Finance suggests it is understood that this rate will stand, the companies paying as heretofore, but, if at the end of the year, it is found that tax on a Company's income would realize more to the Treasury than has the 10 cents a ton, the Company will be required to pay the difference. In other words the Company will be taxed on whatever basis is found to bringing the greater amount to the public exchequer.

It must be understood that there is no definite assurance as yet that this is the Government's policy because the bill amending the taxation Act is not before the House up to the time of writing, but it is the only interpretation that can be placed on Mr. Hart's budget speech and operators are satisfied that nothing further will be done this year. As far as can be gathered there is no particular objection to the proposal though there would have been to any suggestion that the tax on the per ton production be raised. The

argument brought against such a move is that British Columbia coal to a large extent comes into competition with that of the Province of Alberta and the coal of the latter Province is taxed only 5 cents a ton.

The "Sale of Shares" Act.

Yesterday's Canadian Press dispatch from Toronto which intimates the withdrawal of mining concerns from the scope of the "Sale of Shares Act, 1919," has caused a good deal of satisfaction in the north, where it was feared an interference with the sale of stock in mining companies might have a serious effect without achieving the desired results. It is considered as very probable the government will take steps to enforce existing laws with a view to prevent misrepresentation, rather than regulate sale of stock. The suggestion is being put forward that the Ontario Bureau of Mines be given jurisdiction over stock companies engaged in mining, is one that will be brought to the attention of Attorney-General Hon. I. B. Lucas, for consideration. The importance of the silver mining industry of this district is further emphasised to-day in a review of the figures which show the output up to the beginning of the current year. This district has a total precious metal production of $216,627,283 to its credit, of which $169,241,387 is credited to the silver mines.

Interests engaged in the gold mining industry of the north have more reason to be pleased over the outcome of the "Blue Sky" bill than even the silver mines. The reason for this is the fact that many new companies are necessary if the many excellent gold mining prospects are to be explored efficiently. In the Porcupine field mining activity is gaining momentum each day. A similar condition prevails in Kirkland Lake, and in the Boston Creek field. Summer should see the majority of the mines in full operation. In the Kirkland Lake field it is officially announced the mill of the Kirkland Lake Gold Mines will be set in operation on Monday, March 1st. It is also officially declared the merger of the Tough-Oakes with the Burnside and the Sylvanite is nearing successful conclusion .

During the last two years a considerable amount of money coming from the Mines Department Fund, has been expanded in this District in building and improving roads and trails to mining camps and properties. This policy, by providing transportation to these hitherto inaccessible sections will undoubtedly within a short time give results in the shape of increased production.

At Harpers Camp on the Horsefly river and on Black creek a tributary of that river, there is renewed interest in the placer possibilities. The plant of the International Dredging Company at Harpers Camp was completed last season and a short test-run was made. This Company is using a mechanically operated scraper for digging and elevating the gravel to a flume where it is washed. The system as applied to placer mining being a new one. The work next season will be closely watched, because, if successful, many deposits of lowgrade gravel which cannot be worked hydraulically, could be mined by this method.

Drilling of the deeper ground at Harpers Camp to find the continuation of the rich channel worked out by the old timers may be carried out this summer by the Government.

The present high price of platinum has caused renewed interest in the occurrence of this metal in the black sand of the Quesnel river. It has been known for many years that some of this black sand, which is a concentrate from the panning of the stream gravels, carries variable amounts of platinum.

At Twenty-mile creek, the Quesnel Hydraulic Gold Mining Company has installed a mill in connection with the hydraulic plant to save this black sand. From the old Bullion mine some platinum was always recovered when the pit was in operation.

LOOKING FOR FOREIGN EXPORT TRADE.

The Sullivan Machinery Co. has established a Foreign Trade Department, and plans to increase its export business. The company has well established branch offices at London, Paris, Santiago and Sydney. Engineering agencies handle Sullivan products in Christiania, Amsterdam, Gijon, Turin, Algiers, Tunis, Johannesburg, Durban, Shanghai, Tokio, Lima and Buenos Ayres.

COAL WASHING TABLE.

The Deister Concentrating Company has issued a special bulletin describing "the No. 7 diagonal deck coal washing table."

The company has recently published its general bulletin for 1919, descriptive of the Deister-Overstrom diagonal deck types of ore concentrators.

METAL PRICES ADVANCE.

There has been during the week ending April 5 a stiffening in metal prices.

Prices on car load lots in Toronto on April 5th are: Copper, 17 cents per lb.; lead, 6⅛ cents per lb.; spelter, 7.20 to 7.25 cents per lb.

This spelter price is for April only. A premium is being asked for May and June.

During the week copper advanced ¼ to ⅜ cents per lb. Lead was about the same as last week, but shows more strength. Spelter is stronger than last week.

FIDELITY MINING AND DEVELOPMENT CO.

The Fidelity Mining & Development company is developing property which adjoins the La Belle Kirkland, north of Kirkland Lake. In a report to the directors manager R. R. Tough says: "During the month of January very little work was done with the exception of hauling in supplies, cutting roads and performing thirty days' assessment work on the south claim of your company in the Township of Teck, adjoining the Fisher property, where we uncovered a very promising vein. During the month of February the cookery was completed. A bunk house to accommodate eighteen men has been built, also an office, pump house, magazine, powder-thawer, blacksmith shop and a power-house. Machinery consisting of boiler, three-drill compressor and hoist, has been installed. Timber has been cut and framed for headframe, also for thirty feet of shaft.

"The shaft on the east 'Lavallie' claim has been dewatered and enlarged and some sinking has been done. The vein looks very promising, being heavily mineralized and showing considerable molybdenite. Two hundred feet east of the shaft in the low ground the vein is four feet in width and shows free gold. This gives us reason to anticipate fair values at 100 ft. level, which we expect to reach during the early part of April."

Special Correspondence

NORTHERN ONTARIO.

Gold and Silver Production.

According to official statistics now to hand the total production of gold and silver from the districts of Northern Ontario, up to the beginning of 1919, amounts to $216,627,282, which has been produced since 1903. The silver mines of Cobalt produced $169,241,387. The gold mines of Porcupine produced $44,578,909, while the gold mines of Kirkland Lake show a production of $2,806,987. This summary of the production of the district up to 1919 does not include a small output from a number of properties in districts not definitely associated with the Cobalt, Porcupine and Kirkland Lake camps. Of the above huge production of the mines it is estimated that approximately forty-two per cent. of the total amount has been returned to shareholders in the various mining companies in the form of dividends, thereby adding to the wealth of the world to the extent of $91,065,110.04. Very few precious metal mining camps in the world can show a record of such high dividend return on gross production.

Porcupine Crown.

Considerable underground work has been done at the Porcupine Crown Mines at Porcupine, since the recommencement of operations several weeks ago. Mr. Harry Harling, manager of the property has been absent for some time, the work being in charge of the mine captain. Mr. Darling will return to the property in the course of a few days and immediate steps will be taken to place the mill in operation. An unfortunate cave-in occurred at the property some time ago, causing the displacement of a large tonnage of rock and blocking a portion of the underground workings. But for this mishap, it is highly probable the mill would already be in full operation. The tonnage of ore broken in the various stopes of the mine is sufficient to keep the mill in operation at full capacity for a period of six months without drawing on the unbroken ore reserves of the mine. The grade of ore at the Porcupine-Crown is slightly higher than that at either the Hollinger-Consolidated or McIntyre mines averaging between $10 and $11 per ton. While the estimated ore reserves now total upwards of half a million dollars, there is also a large tonnage of mineralized rock which may in due course be included in the ore reserves of the mine, providing costs decline to a point on a level with that prevailing before the war, which would allow of a profit on its treatment. In the meantime the main workings of the mine are being continued from a depth of 1,100 feet to 1,400 feet and should add materially to the already large known ore reserves. Diamond drilling in an endeavor to locate commercial ore bodies on other portions of the property are also in progress. Thus, with a cash surplus of upwards of a quarter of a million dollars now on hand and the early commencement of production at full capacity at the property, the company is expected to be in a position to recommence the disbursement of dividends at the rate formerly inaugurated (3 per cent. quarterly or 12 per cent. per annum), in the near future.

Decision of Commissioner Upheld.

The decision of the Mining Commissioner, T. E. Godson, K.C., in the case heard last November, regarding the Howey-Counchenour claims in the Lightning River district, has been upheld by the Appellate Division of the Supreme Court of Ontario. The dispute was one filed by R. N. Austin against W. M. Counchenour, L. B. Howey, M. R. Howey and G. F. Martin, and involved a mining property in the Lightning River district on which two promising gold discoveries have been made, and had to do with an agreement a portion of the conditions of which had been complied with by the claimant Austin. The decision rendered by the Mining Commissioner and upheld by the Appellate Court was in effect that the case be dismissed, Austin paying the costs of the case on the County Court scale, the records of the case to be filed at the recording office at Matheson, Ont.

Hurricanaw.

Revival of interest in the Hurricanaw River district is apparent, and considerable new interest is being evinced in connection with the recent developments. A small mill (the only one in the district for treating gold ore) has been installed on the Martin property. While a good deal of encouragement has been met with, the production from the Martin has been of a more or less erratic nature. The shaft on the property has been driven to a depth of 90 feet and will be continued to a depth of 125 feet, where the lateral work will be enlarged upon. The mill on the property has a battery of ten stamps.

On to Hudson Bay.

Prospectors generally are keenly alive to the tremendous possibilities likely to follow the extension of the T. & N. O. Railway in the movement which has now come to be known as the "On to the Bay" project. If this railroad is built a large area of land will be made accessable to prospectors which offers great inducements to men following the profession to exert their energies in this direction. Very few prospectors have paid any attention to the regions north of the T. C. R. Lignite of an inferior quality has been found on the Mattagami river. Not only will the mineral possibilities of the district attract attention, but also those of lumbering, fishing and power development should also come in for attention.

More Development Work Possible Now.

One of the most conclusive evidences of the improvement in the labor situation in the North Country is to be found in the fact that no difficulty is now experienced in securing men for the performance of development work on mining claims. Already some of the urgent spring work is under way, while parties are leaving for the various districts from day to day and others are making arrangements for the prosecution of extensive explorations and general prospecting during the spring and summer months, and in some cases fairly large parties are being formed to work claims on which extensions have been granted during the past two years, owing to scarcity of men to perform the necessary work required by law. Up until the present time, the majority of prospectors have been going into the Boston Creek area, which is close to the railway and easily accessible.

Alexo Nickel Ore.

The shipments of nickel ore from the Alexo Mine at Porquois Junction during the second week in March amounted to 408,000 pounds, and was contained in four cars. This compared with three cars during the first week having a total weight of 310,000 pounds and makes a total of 718,000 pounds for the first half of the current month. It is therefore evident that the present month's shipments will come close to the record if not establishing a new record for production for any monthly period of the company.

Boston Creek.

Following the announcement of results met with in the diamond drilling of the Cotter property in the Boston Creek district comes the news of increased interest in the immediate district. It is learned that among other deals pending is one where the vendors have under consideration an offer of $200,000 for a small group of claims on which practically no development work has so far been done. When the high values were first encountered on the Miller-Independence, it was the general opinion that such a rich orebody would not be found to run far. However, at a vertical depth of 492 feet, the drill operating on the Cotter cut a vein more than 28 feet in width, and with an average gold content of $12.42 to the ton. It then became evident that the great body of ore was consistently continuing to the east, and although not so rich as on the Miller-Independence, it nevertheless indicates a great future for the Cotter. In this connection it is interesting to note that the Hollinger Mine, now conceded to be one of the largest gold mines in the world produced nearly ..6,000,000 from ore averaging a little under $10 per ton in 1918, and according to the last report had $41,000,000 in ore reserves which average $9.15 per ton. Thus the indication of the big vein with $12.42 in gold to the ton on the Cotter stamps this property as one of major importance, which may reasonably give added impetus to the entire Boston Creek camp, which promises to be the scene of extensive and far-reaching developments during the next few months.

Lucky Baldwin.

Work is being resumed on the Lucky Baldwin property, which lies about five miles southwest from the proven mines of the Kirkland Lake Gold camp, near Kenogami Station on the T. & N. O. Ry. About two years ago a small mining plant was installed on the Baldwin and a considerable amount of development work was done with a fair degree of success.

La Rose Report.

The twelfth annual report of the La Rose Mines, Limited, recently issued, showed a surplus as of December 1st, 1918, of $456,046 after paying a 2 per cent. dividend during the year. Silver production during 1918 amounted to 228,556 ounces, which showed a net profit of $45,544. What was gained in the price obtained for the silver 99.83 cents per ounce, was largely offset by the increased cost of production, which was 87.17 cents per ounce, due to the increased cost of labor and supplies. As no new ore was discovered in the parent mine, the La Rose, and all the dumps have been milled, this mine may be said to be nearing exhaustion. A limited tonnage remains in the Lawson property dumps. Some ore was located in the Princess Mine. There, ore is being broken with "sufficiently satisfactory results to justify further investigation," and preparations are being made to unwater the second level for this purpose. A new level was opened on the Violet Mine. There, and elsewhere an ore shoot about 60-feet long has been proven. This ore is said to be "erratic," but "there is a certain amount of high grade and the adjoining rock carried milling values." Other work is proceeding on this property. An option has been taken on a silver prospect in the Kamloops District, British Columbia, and this is being developed. The La Rose surplus consists of $253,533 in cash and call loans, $100,000 in Victory Bonds, $9,081 in accounts receivable, accrued interest and supplies, and $107,544 in ore in transit, at the smelter and at the mine ready for shipment. Since the foregoing report was issued important developments are understood to have taken place at various portions of the company's Cobalt property. At the present time interest in the company's affairs centres around the dispute as to the ownership of a certain piece of land on the boundary line of the La Rose and O'Brien mining properties, on which the shaft from which the La Rose is developing the Violet claim, is situated. The case comes up for hearing early in April, and is attracting a good deal of interest and is of vital importance to the La Rose.

McKinley-Darragh.

The new electric pump for pumping the sands and slimes from the bed of Cobalt Lake to the McKinley-Darragh-Savage Mines new oil flotation mill has been installed and work will be resumed in this portion of the plant during April. The new electrically driven pumps replace the automatic bucket drag used last summer and fall and will keep the mill operating at capacity.

Offered $1,000,000 for Kirkland Lake Gold Mine?

Unofficial reports are in circulation throughout the north to the effect that the Beaver Consolidated Mining Company has been offered a million dollars for their Kirkland Lake Property, the Kirkland Lake Gold Mines, Limited. The general opinion prevailing in mining circles throughout the district is that with the property at a point where production can be commenced at any time in the new 150-ton mill, and the property developed to a depth of 700-feet there is very little likelihood of the Beaver-Consolidated considering even this tempting offer, which is equal to about fifty cents per share on the stock of the company.

Hollinger.

According to reports from Porcupine, it is probable the Hollinger Consolidated Mining company will be operating at full capacity before the end of the current month. The Hollinger milling plant has a maximum capacity of about twenty-eight hundred tons per day. It is thus apparent that the output of the property from this time forward will show an increase of about fifty per cent. above that of the past year, when the total production amounted to close to six million dollars. The company have over forty million dollars in ore reserves, of an estimated value of $9.15 per ton, and a large acreage of virgin ground with numerous undeveloped veins.

Lake Shore.

During the month of February the Lake Shore Mines of Kirkland Lake produced $41,605, as compared with $45,162 during the preceding month. The slight decrease was due to the shortness of the last month. The January output averaged $1,456 daily, while that of February amounted to $1,485 daily. The official report of operations at the mine for the month of February were as follows:—

200-foot level.—The drift on No. 2 vein east was advanced from 380-feet to 482-feet.

400-foot level.—On No. 1 vein West, north branch, a raise was started to connect with the third level workings, the total advance being 15 feet. The drift on No. 1 vein west, north branch, was advanced from 491 feet to 542 feet. At 523 feet a fault was encountered and a drift was run south on same for a distance of 29 feet.

On the No. 1 vein west, south branch, the crosscut was advanced from 49 feet to 65 feet. The north branch of the No. 2 vein east was advanced from 453 to 463 feet, while the south branch was driven ahead from 452 to 465 feet.

The No. 2 vein west, was advanced from 214 feet to 248 feet.

Milling.—The mill ran 98.8 per cent. of the possible running time, reducing 1,651 tons of ore and recovering therefrom $41,605.21.

The foregoing report designates that the greater portion of the development work for the month was done at the lower levels of the mine. The general efficiency of the mill is demonstrated by the fact that the plant ran 98.8 per cent. of the possible running time, treating on an average of 59 tons of ore daily, with an average gold content of $25.20 per ton.

The dividend declared by the company (payable Thursday, March 27th), was the third disbursement since the commencement of milling operations in March of last year. The disbursement was 2½ per cent, and called for a distribution of $50,000. Although the earnings of the company are greater than 2½ per cent quarterly, the dividends up to the present time have been of an interim nature, permitting of the accumulation of a substantial surplus, such as the importance of the mine warrants. The performance of the property during its first year of operation from a milling standpoint is highly gratifying to the shareholders, who have participated in the distribution of profits to the extent of $150,000. With an enlargement of operations the earnings of the company could also be increased, permitting of more liberal profits for the shareholders. The future for the Lake Shore looks very bright.

Will Work in Skead Township.

Among companies which are contemplating a resumption of work in Skead township is the Lincoln-Nipissing Mining Company. A number of other companies are making arrangements for extensive development work in the district during the coming spring and summer months, and it is anticipated Skead township will experience its most active days in the near future.

Taking on Miners at Dome Mine.

Announcement has been made that a full force of underground workmen will be working at the Dome mine by the end of the current week, and milling operations will be in full swing about the middle of April. The ore broken in the mine is sufficient to keep the mill in operation for a considerable time. According to the last report of the company, upwards of 400,000 tons of ore of an average value of $5.10 per ton was broken in the stopes ready for hoisting to the mill, while the total ore reserves blocked out at the property above the 700-foot level is close to $10,000,000. The mill at the Dome mine is the second largest in the camp, having a capacity of between 40,000 and 45,000 tons per month. Previous to the war the costs of treatment and mining at the Dome Mine was less than $2.50 per ton of ore treated, and on the treatment of ore of a general average of less than five dollars per ton the company was able to pay dividends of 20 per cent per annum. Thus, while a large amount of the surplus in the treasury at the time of closing the mill has been spent in developing the lower workings of the mine and installing machinery for the more economical handling of the ore, sufficient funds are still available to carry the company to the producing stage again, and it is confidently expected earnings, with increased efficiency in various branches of the big mill, will be materially increased, permitting of the company resuming dividends again in the near future.

Shipping Ore From Salmon River.

Mr. B. Bush, of Vancouver, who has just returned from the North, states that $50,000 worth of ore per month is being shipped out of the Salmon River Mining District of British Columbia. The shipments are from the old Salmon-Bear River Mining company's property, now being developed by R. K. Neill, of Spokane, Wn. Mr. Bush, who is the original locator of this property, has great faith in it. He believes that it will make the Salmon River Valley District famous from a mining standpoint. He says: " Alarge minerfrom a mining standpoint. He says: "A large mineralized zone 400 feet wide has been traced for more six different claims. These claims are owned by the Premier Gold Mines, Limited, and the Bush Mines, Ltd., of Vancouver. Several ore shoots have been discovered in this zone, one of them being 110 feet wide and 1200 feet long." Mr. Bush states that a tunnel has been driven under his direction for 400 feet on this ore body, and that several crosscuts, one of them 90 feet long, have been driven without encountering the footwall. The ore he states carries high values in gold and silver.

Assembling Plant at Copper Mountain.

It is reported that advantage is being taken of the ready transportation facilities provided by the winter snow to hasten preparations for the opening of the Canada Copper Corporation's large new property and plant at Copper Mountain. Some heavy loads have been taken up the mountain on sleighs, the compressors and other machinery having been so conveyed to the mines for installation in order that the plant may be in shape for operation when the high power line of the West Kootenay Light and Power Co. is complete and the "juice" is ready to be turned on. The load which broke all records was a piece of electrical machinery weighing nine tons, which was hauled by 10 horses most of the time, but required an additional two over the heaviest of the grade. A 12 ton compressor wheel, in two sections, made two other comfortable loads of six tons each.

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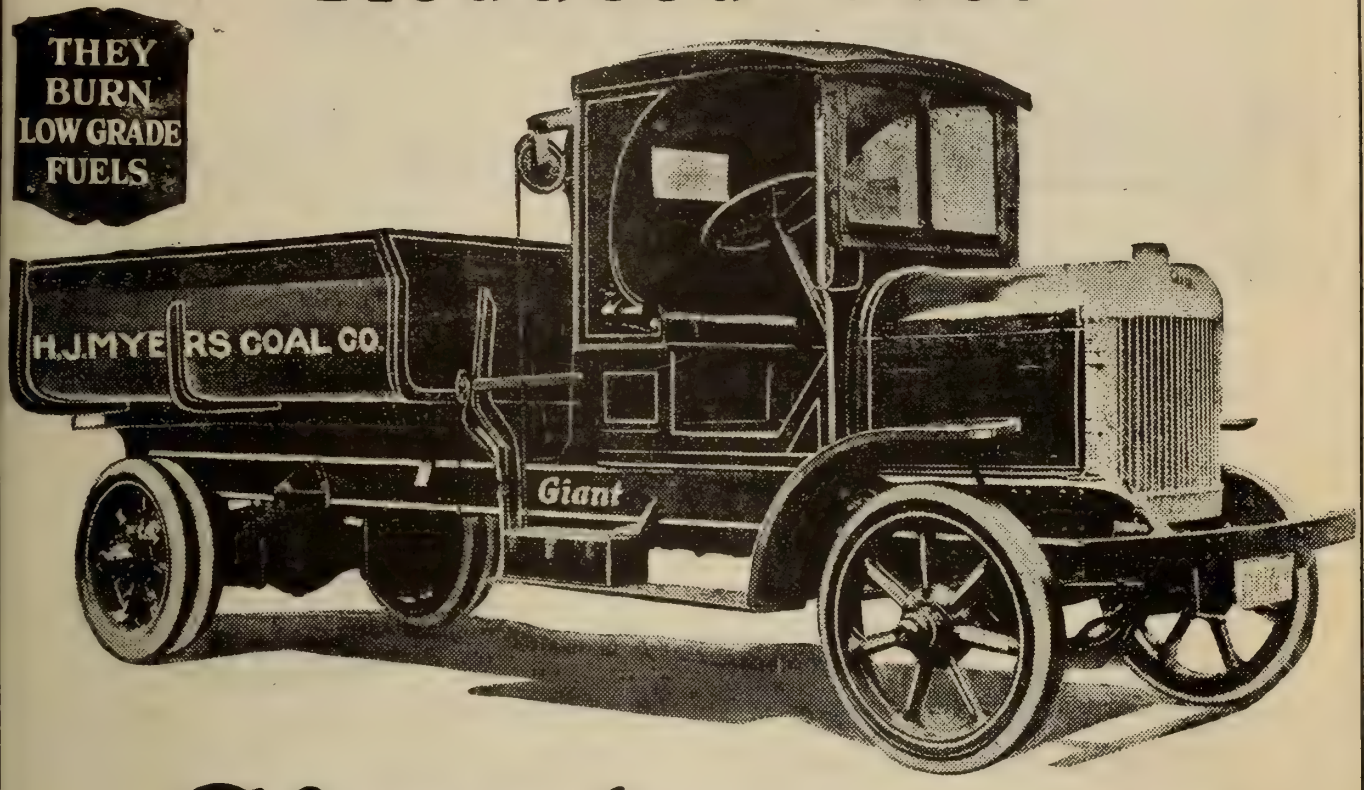

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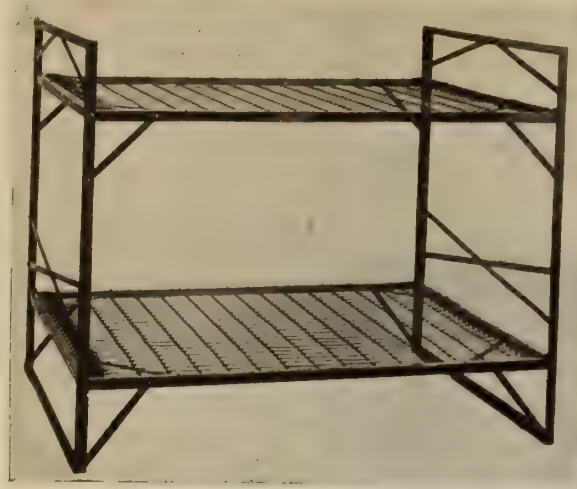

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CHAIR OF MINING.

The Governing body of the Imperial College are now prepared to receive applications for the post of Professor of Mining in the Royal School of Mines, shortly to become vacant. The new Professor will be required to take up his duties in September, 1919.

The Rector of the College will be glad to afford further particulars.

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:-: EDITORIAL :-:

CANADIAN COAL AND IRON AND THE TARIFF.

It should by this time be plain to all who have followed history since August, 1914, that the possession of coal and iron deposits, and their utilization in the arts, is a first requisite of national commercial importance, and also a first requirement of national defence.

The world may be—we sincerely trust it is—about to see disarmament and the abolition of conscript armies raised for the purposes of aggression. But the realization of ideals has time and again eluded the world when realization seemed most imminent, and in the questions of national armament there is no middle course. Either this world is about to see armies and navies reduced to small forces adapted for police purposes, or it is about to see armaments on a scale which even we in our day have not conceived.

Where does Canada stand in the matter of coal and iron supply? The iron and steel industry, which is mothered and fathered by coal supply, has now risen to be one of the most important single branches of industry in the Dominion. The disturbing feature is that this grat superstructure of industry is reared on a shifting foundation, namely, a protective tariff, and is moreover dependent upon an outside source of supply for the raw material, because out of 2,242,337 tons of iron ore charged to furnaces in 1918, only 96,745 tons was ore of Canadian origin.

What about coal supply? The most thickly populated centres of Canada, the most highly industrialized, are, with the exception of the sporadic urban districts of Nova Scotia, utterly and entirely dependent upon United States coal at the present time.

What is the inevitable result of economic dependence? Is it not political subservience, sooner or later?

Canada has a coal production of 15,000,000 tons annually, and her iron ore production is negligible. The United States has an annual coal production of between 700 and 800 millions of tons, and the greatest output of iron ore in the world.

There are just two courses open to Canada. She can shape her fiscal policies so as to encourage the development of her coal and iron resources, thereby assuring herself of a modicum of political independence and some powers of military resistance, or she can resign herself to depending on the United States for coal and iron, or in other words, can place our country unreservedly at the mercy of our neighbors. There is the issue. We express no opinion thereon.

It is reported that the Canadian Pacific Railway has asked Parliament for authority to build a railway from Lanigan, Saskatchewan, to a point near the Carrot and Saskatchewan rivers, west of The Pas, Manitoba, to a point near Cumberland House. Such a line would serve good agricultural areas but it is the possibility of further extension to Northern Manitoba mineral areas that makes the news of particular interest to us.

CLASS LEGISLATION FOR ENGINEERS.

Some of the members of the Engineering Institute of Canada are conducting an active campaign in an endeavor to secure legislation which will make the engineering profession a closed corporation, such as that of medicine and law. Meetings have been recently held at which it was contended that great benefit would accrue to engineers by the securing of such class legislation.

Periodically some of those interested in engineering societies take up this question. Some engineers really believe that engineering societies should exist solely for the benefit of the members rather than for the benefit of the community. Naturally, therefore, they estimate the success of the society wholly by the individual benefit to be derived from its activities. They would attract engineers to such a society by claiming that the society will secure for its members some special privileges.

There is no good reason why engineers who consider their profession underpaid should not form unions as other workers do, to sell their services at a proper price. We agree that technical trained men in this country, on the average, are not receiving proper compensation for their labor. But we do not agree that any class of workers, be they engineers, drill runners or bricklayers, should be given, by legislation, exclusive rights to work at a given profession or trade, unless the determination of the qualifications of workers is undertaken by the Government. No engineering society should be allowed to usurp the functions of government.

It is sometimes argued that mining engineers should join the Engineering Institute of Canada, because that society is very active in the interests of its members, while the Canadian Mining Institute is not. The Mining Institute can well afford to lose those who would change their allegiance for such a reason. The Mining Institute is organized on a plan which does not allow service to members to be placed on a level with service to the industry. If there is any advantage it must come indirectly, as a recognition for service to the industry and the community. We are quite willing to admit that there are other and better reasons for appealing to mining engineers to join the Engineering Institute. We believe that, for many, membership in both Institutes would be desirable. But we do not get a higher opinion of the Engineering Institute for such activities as this campaign for class legislation. We are pleased to see signs of vigorous life in the Engineering Institute, and we wish it every success in its other activities. We hope, however, that in this effort it will fail.

The new haulage slopes at the Nova Scotia Steel & Coal Company's mines at Wabana are a little over two miles long. With these completed, the company has quick and easy access to its main ore deposit. The mining of this ore will be one of the greatest of submarine accomplishments.

VOCATIONAL TRAINING FOR RETURNED SOLDIERS.

Some idea of the work being done by the Vocational Training branch of the Department of Soliers' Civil Re-establishment was given last week at a meeting of the Royal Canadian Institute, Toronto. Knowing that the man in charge of this work for Ontario is a mining engineer, Mr. H. E. T. Haultain, Professor of Mining in the University of Toronto, and that the whole department is under the direction of another mining engineer, Mr. W. E. Segsworth, of Toronto, our readers will be particularly interested in what is being accomplished.

About 150,000 Canadians have been wounded in the war. An attempt is being made to help all these men to overcome their disabilities. To a large extent the effort has been successful. The department workers begin their work with the returned men in the hospitals. In Ontario occupational work, such as weaving, basketry, wood carving, leather work, metal work, etc., is taught the men by aides trained by the Ontario branch at the University of Toronto. There have also been established curative workshops, where shoemaking, carpentry and other occupations are taught.

When a man is discharged from the hospital he is given the opportunity of training for a suitable position. A Board comprised of one medical man, the vocational officers and one layman outsider connected with the industry, helps in the selection of the occupation, arranges for teaching, secures a position for the trained man, and takes an interest in him until he is satisfactorily engaged in a suitable occupation.

Speaking of the work of this board, Prof. Haultain said:

> "This staff examines commercial plants and and factories, and makes arrangements for courses, being constantly in search for jobs wherein disabled men can be retrained. Each operation in industry is considered from the point of view of the disabled man. Our inspectors visit these industries weekly and report on the mans conduct and progress.
>
> "This staff keeps track of all retrained men in Ontario. They are visited at their homes and occasionally at their places of employment. By means of these visits and by correspondence, a complete record is kept of every retrained ex-soldier.

The work in which Mr. Segsworth and Mr. Haultain are engaged is proving very successful. Hundreds of men have been retrained and hundreds are applying for training. There are now in Ontario classes 2,300 men. In the other provinces also the work is being carried on, the numbers being naturally smaller.

We understand that in placing men back in industrial occupations the Department has found mine managers very willing to co-operate. With the example of Segsworth and Haultain before them, they will not be satisfied until they have done much more than is expected of those in other industries.

Mr. T. J. Flynn, superintendent of Matachewan Gold Mines, who has been in New York for some time, is again at the Otisse property, work there having been resumed.

MR. SEGSWORTH'S WORK.

Walter E. Segsworth, Director of Vocational Training of the Department of Soldiers' Civil Re-establishment, has resigned. He will represent Canada at the Inter-Allied Conference on the re-habilitation of the disabled soldier, which is soon to be held at Rome, and will then take a rest before returning to private business.

He has been Director of Vocational Training since July, 1917. He will be succeeded by N. F. Parkinson, who since he returned from overseas has been Mr. Segsworth's assistant. In announcing Mr. Segsworth's resignation, Sir James Lougheed, Minister of Soldiers' Civil Re-establishment, says:

"Mr. Segsworth is one of those true Canadian citizens, who, during the war have done their part in solving war-time problems without considering their personal gain. Ever since he undertook this work at my request, he has devoted his entire energies without remuneration, to a problem for the solution of which there were no precedents, and which was of the complex character. He conceived the principles of industrial re-training along original lines, secured the sympathy and co-operation of educationalists, organized labor, and employers, and developed quickly a nationwide organization for the conduct of the work effectively and economically. In conceiving the plan for the rehabilitation of the disabled soldier, he applied the knowledge he had from university and technical training. In the building up and administration of the large organization necessary, he applied the principles he had found successful in the large commercial enterprises he has directed. The success of his efforts is a credit to pure Canadian enterprise and ability. Testimony that Canada is in the forefront in the possession of a comprehensive and successful national scheme of rehabilitation for disabled soldiers has come from all the allied nations."

NORTH CANADA EXPLORATION CO.

The mining machinery of the Sultana mine, at Kenora, is being shipped to the Pas, for use at Mile 194 on the Hudson Bay Railway. The North Canada Exploration Company are the owners of this machinery, and also owners of the Sultana mine. Last September they purchased from John Forbes eight mining claims situated a short distance off the railway, at Mile 194, for $280,000. A shaft 75 feet in depth, was sunk on one of the claims, and assays of the ore encountered went as high as $300 to the ton in copper, gold, nickle and silver.

These eight claims are to be incorporated into a company, to be known as the White Bear Mining Co., and active mining is expected to be carried on about June 1st.

Mr. John Forbes, the locator of this discovery, says the orebody is twice as large as the Mandy and Flin-Flon put together. He points out that it has a 72 foot lead, and runs for 7,000 feet without a break.—The Pas Herald.

H. C. Carlisle is leaving the Mandy mine for France. Mr. Carlisle is interested in the engineering designs of reconstructing the devastated portions of the French battle fields. He may go with a body of American engineers. The Mandy will close down further operations pending the arrival of a railway from The Pas. It is estimated that 180,000 tons of low grade ore lies undeveloped in the mine.

Annual Meeting of Mining Society of Nova Scotia

The 26th Annual Meeting of the Mining Society of Nova Scotia will be held in New Glasgow on the 23rd and 24th of April. The President, Colonel Thomas Cantley, will be in the chair. Following is provisional programme of the proceedings:

Wednesday morning, the 23rd, will be taken up by ordinary business, and the presidential address.

In the afternoon papers will be presented as follows: "Salt & Salt Mining," by Mr. L. H. Cole, of the Department of Mines. This paper will have special reference to the recent discovery of rock-salt at Malagash, Nova Scotia, which was described in a recent nuumber of the JOURNAL.

Mr. C. M. Odell, Resident Engineer of the Dominion Coal Company, will speak on "Romance and Rascality in Coal Mining," two subjects on which he is especially qualified to speak. Those who heard Mr. Odell speak last year in Sydney on "Gas Engines" have pleasurable anticipations of his latest exposi tion.

Lt. George Morley, of Glace Bay, was formerly employed in the Survey Department of the Dominion Coal Company, and will describe tunnelling operations on the Western Front. This is a subject that will appeal to the Cape Breton members, who were so well represennted in the tunnelling corps.

Major J. W. Maddin, President of the Cape Breton Branch of the Great War Veterans' Association, who went overseas with the 185th Cape Breton Highlanders, will speak on the "Returned Soldier."

On Wednesday evening, Dr. A. O. Hayes, of the Geological Survey, will give an illustrated description on the "Origin of the Iron Ore Deposits of Wabana, Newfoundland." Those who are familiar with Dr. Hynes' monograph on this subject will look forward with pleasure to seeing microscopic slides of the boring algae which are believed to have played so important a part in the formation of the Wabana ores. It is expected that some interesting references will also be made to the early history of the development of the ore properties by members of the first prospecting parties.

On Thursday visits will be paid to the Shipbuilding Plant of the Nova Scotia Steel & Coal Company at Trenton, and to the Allan Shaft Colliery of the Acadia Coal Company at Stellarton.

In the afternoon a paper is anticipated detailing some of the recent geological discoveries and ascertained facts yielded by the prospecting work carried on for several years past by the Mining Engineer of the Acadia Coal Company. Some long-debated and much disputed conditions in the Acadia Company's area of the Pictou coalfield should be better understood, as the result of the information it is anticipated this paper will give the members of the Mining Society. An active discussion is looked for following the paper.

Mr. F. E. Lucas, the Economy Engineer of the Dominion Steel Corporation, will speak on the "Market for Nova Scotia Coal," and Mr. J. D. Kendall, of Sydney, will give a paper on the "Formation of Coal."

Further papers are anticipated dealing with some remarkable economies that have been effected in the use of compressed air underground by the check afforded by an air-meter, with some remarkable tonnages that have been released in limestone quarry operations by one blasting operation, and a paper is also looked forward to which will tell of a submarine mining operation in Nova Scotia where a thin seam of coal is entirely removed in undersea territory by electrical coal-cutters, and the use of the long-wall method of extraction. So far as is known this colliery is carrying on unique practice in Nova Scotia, and it is hoped this paper will be presented.

The meeting will end with a smoking concert.

The Nova Scotia mining men are anxious to see visitors from the West, and any who can make the trip will, in addition to receiving a warm welcome, hear some papers worth while, and will, we believe, not be disappointed in the discussions.

The Canadian Mining Institute will be represented at this meeting by Mr. D. H. McDougall, who, in addition to being President of the C. M. I., is also the past-President of the Mining Society of Nova Scotia. —F. W. G.

ROBERT BRYCE.

Mining Engineer, Toronto, recently elected a councillor of the Canadian Mining Institute.

-:- The Dolly Varden Case -:-

The Mining Committee of the British Columbia Legislature has submitted a report declaring that the Taylor Engineering Company, which met with financial disaster in the construction of a railway from the coast at Alice Arm, B.C., to the Dolly Varden Group of Mineral Claims, is justly entitled to payment in full of the cost of the work done plus 10 per cent contractor's profit. It is asserted that the evidence shows that the contracting company had assurances that its investment in the road, beyond the originally estimated cost, would be repaid and that, reposing confidence in these assurances, it went forward to the limit of its financial ability. Therefore the committee takes the position that the contracting company, and its creditors, should be fully protected before the Provincial Legislature consents to the renewal of the railroad charter.

Recommendations made by the Committee to the House may be summarized as follows:

That the charter of the Dolly Varden Mines Railway, which expired on December 31st last, be renewed to the Dolly Varden Mines company upon compliance with the conditions set forth in the draft bill accompanying the report; that in the event of the mines company and the engineering company being unable to agree upon the construction cost in 1918, it be referred to the Supreme Court to ascertain the cost, and that cost, together with 10 per cent thereof added for contractors' profits, be declared a debt owing by the Dolly Varden Company to the engineering concern; that the sum ascertained be a charge on the railway and all assets of the Dolly Varden Mines Company in British Columbia, subject only to a mortgage for $150,000 and interest in favor of Goldfields Consolidated, from which the Dolly Varden Mines Company borrowed that amount at six per cent interest, and which mortgage fell due on the 1st of January last, and to the balance of purchase money due to Donald W. Cameron in respect of the Wolf Group of Mineral Claims.

Further, the Committee recommends that all wages for work on the railway in 1918 be paid by the Dolly Varden Mines Company within fourteen days after the enactment of the Act presented along with the report; that the balance of the moneys due to the Taylor Engineering Company in respect of railway construction be paid within thirty days after the amount thereof is ascerained, and that, if the mines company does not wish to assume the burden of such payments, it must notify the Minister of Railways within one week after the adoption of the report by the Legislature in which event the Taylor Engineering Company shall have the right to acquire from the Dolly Varden Mines Company the railway and all assets, the mines company to be entitled to receive from the engineering company the amount of its investments in such assets. Also that in the event of the engineering company acquiring the railway and assets, it shall pay off the mortgage to the Goldfields Consolidated or otherwise protect the mines company against all claims and also the amount due on the purchase of the Wolf claims. Should the Dolly Varden Mines Company decide not to pay the cost of construction of the railway, and in the event of the engineering company exercising the right to acquire the line upon payment of the amount of the mines company's investment in the same, the latter concern shall be released from all claims in respect of construction of the railroad and be entitled to be paid by the Taylor Engineering Company the amount of its investment.

The draft bill which accompanies the report is a lengthy one, covering all contingencies which might arise from the taking over of the property by the creditors of the Taylor Engineering Company.

An important provision is that the renewal of the charter does not take place until he Dolly Varden Company has first complied with the conditions as to the paying off of the wage claims and securing the general creditors of the Taylor Engineering Company. This provision it is said, instead of being a hardship on the company, was designed by the Committee to safeguard the Dolly Varden Company from any attack through the courts by the Temiskaming Company under its option to purchase. It may be stated here, by way of explanation, that the Temiskaming Company holds from the Dolly Varden Company an option to purchase the Dolly Varden Group of Minerals Claims, the railroad and other associated assets, the consideration being $900,000. Without this provision, it is asserted, the Temiskaming Company would be in a position to bring suit for specific performance, forcing the Dolly Varden Company into a position where they would only have $150,000 or $200,00 left in return for the entire investment of some $640,000.

Should the Dolly Varden Company elect to let the engineering company's creditors pay off the wage claims and take possession of the property they will then be paid in full for their investment out of the profits of the mine, which was the way in which they were to be paid their balance of the $900,000, for which a sale had been agreed upon. The draft act embodies in toto the conditions of operations which the Dolly Varden Company had agreed to accept from the Temiskaming Company, with a clause added providing that in the event of dissatisfaction over the working of the mine and the division of the profits, the aggrieved party may appeal to the Supreme Court and have an independent receiver appointed.

Subsequent to the presentation of the report to the House, Premier Oliver announced that representatives of the Temiskaming Company had complained that they had not been given an opportunity to submit evidence to the committee as to their position. He stated that it was not intended that any interests, concerned in the development of the resources of the country, should leave feeling that they had not been given fair treatment. He therefore moved that the report be referred back to the select committee with power to hear any further testimony bearing on the matter that the company in question or any other parties might have to offer. This was carried.

The committee's report clearly outlines the entire situation as disclosed by evidence adduced and is interesting. It follows, in part:

The dispute between the two companies comes before the Legislature in the form of a petition by the Dolly Varden Mines Company for an extension of the time given to it under the "Dolly Varden Mines Railway Act" of 1917 in which to complete the construction

of the Dolly Varden Mines Railroad, and a cross-petition by the Taylor Engineering Company, Limited, contractors for the construction of the road, praying that such a renewal of the Dolly Varden Mines Railroad charter be not granted except upon such terms as shall constitute their claim for the unpaid balance of the charge for construction, amounting to approximately $462,500, as a lien uopn the assets of the Dolly Varden Mining Company.

Upon the following facts the parties are in substantial agreement: The Dolly Varden Mines Company, incorporated in the State of Delaware, has been developing a group of mineral claims near the Kitsault River, about eighteen miles distant from Alice Arm.

The mining company entered into an arrangement with the Taylor Engineering Company, Limited, for the construction of a line of railroad to connect the mines with tide-water. In pursuance of this object the mining company obtained from the Legislature in 1917 a public Act authorizing it to construct the road. Section 11 of the Act provides that all work must be completed before December 31st, 1918.

At the outset a light dinkey road was required, following the path of an existing pack-trail, with capacity to haul out daily 30 tons of ore or concentrates. The mining company, in its desire to have the road completed and the mine operating before the close of the year 1917, desired that the work should proceed at once without the delay involved in having the usual surveys made and quantities calculated. The Taylor Engineering Company, Limited, accepted the contract on a cost plus 10 per cent basis. A written agreement that the work would not cost more than $175,000 was given by the Taylor Engineering Company, Limited. This agreement, however, was, according to the evidence of Mr. Taylor, supplemented by a private verbal agreement whereby President Hubbard, of the Mining Company, agreed to see that any excess above this figure up to an extra $100,000 would be paid.

After the road was commenced, labour difficulties, the increased cost of materials, improved standard of construction required, and unexpected difficulties in engineering resulted in an expenditure during the first season of over $275,000 without the road being nearly completed. Mr. Hubbard observed the private agreement he had made to the extent of paying the contractor $70,000 out of the extra cost of $100,000, and work was stopped on the construction owing to lack of funds. Up to this point there is nothing in the relation of the two companies which calls for adjudication on the part of your Committee.

The present dispute arises out of the operations for the year 1918. Mr. Taylor was very anxious to complete the construction of the road. At the same time the shareholders of the Dolly Varden Mines Company, through Mr. Hubbard, were endeavouring to negotiate a sale of the property to the Granby Consolidated Mining, Smelting, and Power Company, Limited. Mr. Hubbard represented to Mr. Taylor that the Dolly Varden Company was unable to assume any financial responsibility for further work done upon the road, but assured Mr. Taylor that if he desired to go on at his own risk he would be fully paid in the event of the sale to the Granby Company being made. In the event of the sale to the Granby Company not being made, Mr. Hubbard stated that so long as the work done was done to the satisfaction of the Engineers of the Dolly Varden Company, the Taylor Engineering Company, Limited, would have all its just claims paid and be given proper compensation for engineering and contractor's profits out of any subsequent disposition of the mine.

The letter from Mr. Hubbard to Mr. Taylor, dated May 14th, 1918, is as follows:—

Vancouver, B.C., May 14th, 1918.

"Gentlemen,—I understand that you have proposed to Mr. Sylvester, of the Granby Company, that the Taylor Engineering Company should resume construction of the Dolly Varden Railroad and carry it on pending the examination of the Dolly Varden properties by the Granby Company; that if the Granby Company should elect to exercise its option and purchase the Dolly Varden properties, the Granby Company would reimburse the Taylor Engineering Company for the outlay and make satisfactory arrangements with you for the completion of the road. I understand that Mr. Sylvester has indicated a willingness to accept your offer.

"We are not concerned with any arrangement you may make with Mr. Sylvester in regard to the matter, provided the Granby does ultimately take the properties over; but in case they should not do so, it is obvious that your relations with the present owners of the property would become important and would require serious consideration.

"You are already fully informed of the limitations and conditions affecting the ownership and the policy of the owners at this time, and this knowledge will enable you to readily understand the position which I am compelled to take.

"The owners cannot and will not assume any liability whatsoever at this time. They will recognize neither a financial nor a moral responsibility to reimburse you, or to compensate you for this work in case the Granby Company does not buy the properties. They cannot and will not permit the properties to become subject to any lien for material, labour, or other charges. If the Taylor Engineering Company undertakes this work it will be necessary to have from them an instrument releasing the present owners from any financial or moral responsibility in the matter, and expressly waiving lien rights and protecting the property against such rights, not only as to the Taylor Engineering Company, but as to sub-contractors and material men.

"As against this, you can rely upon the following facts and assurances. If the Granby Company should not exercise its option to take over the properties, it is obvious that the present owners will either have to reorganize, complete the railway, and operate the properities themselves, or dispose of them to some purchaser other than the Granby Company. In either event and subject to the limitations stated below, I will personally assure you that any just claims you might have for the work done and materials furnished will be recognized and provided for either in case of reorganization or sale to others. Compensation for such claims would include not only a reimbursement, but proper compensation for engineering and contractor's profits. This assurance, however, presupposes that all work shall be done to the satisfaction of the owners, and will have to be approved by their Engineers, who would be the sole judges as to whether and how far the work would be acceptable.

"You may safely assume that the Dolly Varden properties with the railway constitute an asset of sufficient value to justify the assumption that any just claim you might have could and would be taken care of in the final 'work-out' of the proposition, and in any event. A final payment of $25,000 is due on October 1st next on the Wolf claims, and the Goldfield Con-

solidated Mines Company loaned $150,000 at 6 per cent, which is due January 1st, 1919, and for which the Goldfield Consolidated Company is entitled to a mortgage. This mortgage has not yet been recorded and its final form is yet to be agreed upon. I cannot personally guarantee it, but I have no doubt the payment on the Wolf claims will be made when due. In spite of the statement, the owners will not and cannot consider any arrangement which might create a lien upon the property, in case of foreclosure of the Goldfield mortgage, and failure to redeem by the present owners, arrangements could and would be made whereby you could redeem from such foreclosure.

"Yours truly, J. D. HUBBARD."

Relying uopn the undertaking given in the latter paragraph of Mr. Hubbard's letter, the Taylor Engineering Company, Limited, resumed construction-work in 1918. All parties were at that time expecting the sale to the Granby Company to be carried out, and the work upon the road was done to conform to the requirements of the Granby Mining Company, which required a road-bed of increased width with easier curves and capable of hauling 400 tons of ore daily. This work was done, as the correspondence shows, under the supervision of Mr. R. R. McGinnis, the Resident Engineer for the Dolly Varden Mines Company.

The work was carried on in 1918 on the credit and capital of the Taylor Engineering Company, Limited, which by the middle of July of that year was at the end of its resources; when the offer of purchase was finally made by the Granby Company, it was refused by the directors of the Dolly Varden Mines Company, owing to dissatisfaction over the proposed conditions of operation. The financial embarrassment of the Taylor Engineering Company was very well known to Mr. Hubbard and his engineer, Mr. McGinnis. On August 19th, 1918, Mr. McGinnis wired to his chief, notifying him in effect that the Taylor Engineering Company were at that date so far committed financially that they could not stop construction without financial ruin. On October 12th the Granby offer was refused. On October 22nd construction-work ceased and the Taylor Engineering Company assigned for the benefit of its creditors.

Since assignment, Mr. Taylor, in his efforts to enable the Dolly Varden Mining Company to obtain the money wherewith to pay off his claim, succeeded in bringing Mr. Hubbard and a representative of the Temiskaming Mining Company, of Cobalt, together. Mr. Taylor endeavoured to effect sale of the Dolly Varden properties to the Temiskaming Company at a price of $1,100,000, his services as an agent in the matter being given without charge. Since then, Mr. Hubbard, of the Dolly Varden Company, and Mr. Errington, representing the Temiskaming Company, have arranged for the sale of the property to the Temiskaming Company at a price of $900,000, which includes a commission of $50,000 to be divided between Messrs. Hubbard and Errington, this sale being conditional upon the renewal of the charter to the Dolly Varden Mines Railway.

The sum of $900,000 is insufficient to pay all parties without loss, and your Committee understands that the proposal of the Dolly Varden Mines Company, which claims to have invested $640,000 in the property, is that the charter for the railroad be extended on condition that they pay in full the wage claims for the construction of the road, amounting to approximately $150,000, and that the creditors of the Taylor Engineering Company divide with them the losses on the mine and railroad project.

It was urged by counsel for the Dolly Varden Mining Company that the President of his company, in his letter of May 14th, 1918, repudiating all moral and financial liability to the contractors, had no authority to bind the company to any undertaking in the event of a sale to the Granby Company not being carried out. Assuming this to be so, Mr. Hubbard having been allowed to assume the direction of the affairs of the Dolly Varden Mining Company, your Committee considers that it would be unjust to allow the Dolly Varden Mines Company to divest itself of liability for the construction of the railway, especially when the company is engaged in marketing the very labour and material which was placed on their property as a result of the inducements held out by its President in his letter of May 14th, 1918.

The correspondence and evidence showed that the work in 1918 was carried out without excessive cost under the supervision of Mr. R. B. McGinnis as resident engineer of the Dolly Varden Company, who reported to the President of his company on September 11th, 1918 (six weeks before work stopped): "The construction-work on the road has been well down throughout, and the only complaint we could make is that they had spent more money on the upper end than we intended to at this time."

Mr. McGinnis also says in the same report to his President: "If Granby takes the property it is all right, and if we keep it we still have a good road, but have a heavier investment than was absolutely needed at the start. We could have changed the road later."

The evidence of the Government Railway Engineers who inspected the line was, however, that the road only met with the minimum requirements, was not extravagantly built, and that had it been less well built they would not have taken the responsibility of issuing the company a certificate to commence railroad operations.

Your Committee, therefore, being satisfied on the evidence that the work was properly performed and that the Taylor Engineering Company resumed operations in 1918 on the promises made in the letter of May 14th by Mr. J. D. Hubbard, President of the Dolly Varden Mines Company, that the Taylor Engineering Company would be paid in full for its just claims, either from a sale to the Granby Company or "sale to others," feels that the Taylor Engineering Company is entitled to be paid in full for its "just claims . . . . for work done and materials furnished," to "include not only a reimbursement, but proper compensation for engineering and contractor's profits," to adopt the language used by the President of the Dolly Varden Company in his letter to the Taylor Engineering Company.

Your Select Committee points out that since the Dolly Varden Mines Company entered into the proposals to sell to the Temiskaming Mining Company for a price of $900,000, an offer of $1,100,000 for the property had been made by Mr. S. S. Taylor, K.C., on behalf of the creditors of the Taylor Engineering Company. This offer is without the payment of commission to any one, and if carried into effect would enable all the creditors to be paid in full and leave a sum larger by over $50,000 for the shareholders of the Dolly Varden Mining Company than under the offer of the Temiskaming Mining Company.

The Geophone

An Instrument for Detecting Sounds Underground.

The geophone, a listening instrument invented by the French during the war to detect enemy sapping and underground mining operations, and for the location of enemy artillery, is now being used by the U. S. Bureau of Mines, Department of the Interior, as a possible aid in locating miners who have been entombed after a disaster. The instrument was developed by United States engineers during the war, and is now used by the bureau according to plans drawn by these engineers.

Alan Leighton, assistant chemist of the bureau, who now has charge of these investigations for the bureau, has given the following statement of general information regarding the geophone:

The instrument, though small, is essentially a seismograph, since it works on the same principle as the ponderous apparatus with which earthquake tremors are recorded.

It consists of an iron ring about thre and a half inches in diameter, within the centre of which is suspended a lead disk which is fastened by a single bolt through two mica discs, one of which covers the top and the other the bottom of the ring. There then are two brass cap pieces, the top one having an opening in its centre to which is fastened a rubber tube, leading to a stethoscopic ear piece. These cap pieces are fastened with bolts to the iron ring, and serve also to hold the mica discs in place.

We then have really nothing but a lead weight suspended between two mica discs cutting across a small air-tight box. If the instrument is placed on the ground and any one is pounding or digging in the vicinity, energy is transmitted as wave motion to the earth, and the earth-waves shake the geophone case. The lead weight, on account of its mass and because it is suspended between the mica, remains comparatively motionless. There then is produced a relative motion between the instrument case and the lead weight. The result is that a compression and rarefication of the air in the instrument takes place. Since the rubber tube leading to the stethoscopic ear piece is connected with this space in the geophone, this rarefication and compression is carried to the ear drum. Usually two instruments are used, one for each ear.

When the two instruments are used, it has been found that the sound is apparently louder from the instrument nearer the source of the sound. It is evident then that by moving the instruments properly a point can be found when the sound will be of the same apparent intensity in both ears. The direction of the sound is then on a perpendicular to the line connecting the centres of the two instruments either in front of or behind the observer. Further observation will show which side. Direction is quite accurately determined in this way. The sound is not actually louder in one ear than in the other, but the ear is capable of distinguishing the difference in time at which the sound arrives in the two instruments. Since this is the case, persons who are slightly deaf in one ear are said to still be able to determine direction with the instruments.

During the period of the war, engineers of the Mining Division of the Bureau of Mines were engaged in determining the distance that different mining machines could be heard through the clay, shale, coal and the mine cover. Measurements were made also of the energy required in blows that they be heard definite distances through clay, shale and coal, as well as the distances at which shock waves resulting from the discharge of various explosives could be heard. A brief investigation of the factors influencing the transfer of energy from a mining tool to the clay and coal was also made in order that recommendations could be made as to the type of mining machine which could be used to accomplish the most work with the least noise.

In this connection it was found that sounds were transmitted only about half as far in clay as in shale strata and about one quarter as far in clay as in coal. To give some idea of the sensitiveness of the instrument it may be said that pounding with a pick on the bituminous coal can be detected for a distance of 900 feet, and the direction determined, and that pounding with a sledge can be heard as far as 1,150 feet. These measurements were made in the Pittsburg coal seam in the vicinity of Pittsburgh, where the coal is somewhat harder than in most other bituminous coal beds. The explosion of a one-ounce charge of dynamite was detected a distance of over two thousand feet through the shale strata. One interesting feature of the instruments is that the sound as transmitted to the ear is very characteristic of the instrument producing the sound. To illustrate: Twelve mining and carpentering operations were carried out on the coal rib. An engineer of the Bureau who had never used the geophones and who did not know what tools were to be operated was able to recognize and name nine of the instruments at a distance of several hundred feet through the strata. The other three sounds were accurately described, but the machines were not identified.

Now that the war is over the Bureau work has turned to the development of the instruments for peace time uses. In this connection it is thought they may be of great value to mine rescue crews who may be entering mines for exploration, and to locate miners who may have been entombed after a disaster. The tests so far made in the vicinity of Pittsburg show that a man pounding on the coal rib with a pick, piece of timber, or a sledge can be detected and located from a point 600 to 1,200 feet distant. This distance depends greatly on the character of the coal upon which the man is pounding, and intervening rooms and entries seem to have surprisingly little effect upon the distance or the determination of direction.

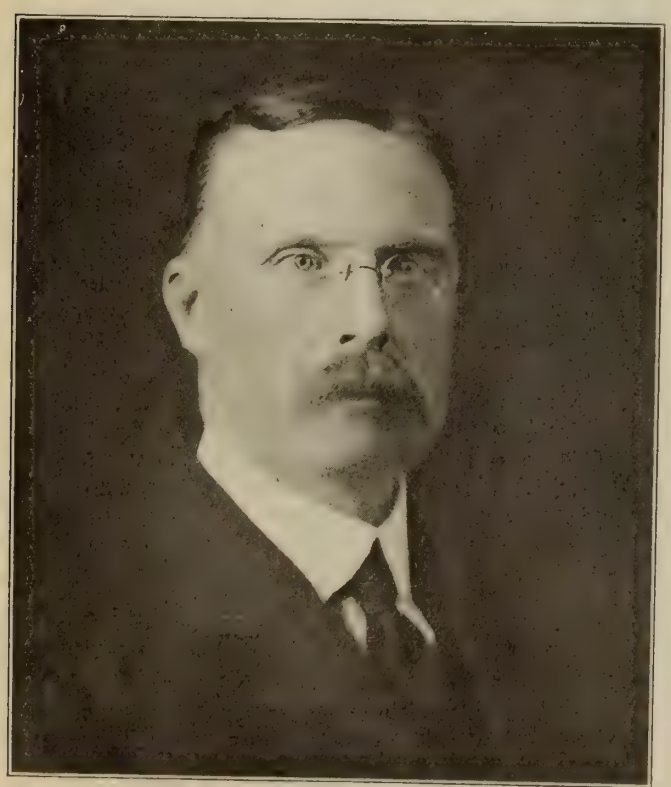
Pounding with a sledge can be heard from two to three hundred feet through the mine cover, depending upon the quietness of the day outside, since any wind greatly interferes with the successful operation of the instruments. It will at once be seen that when mines are not too deep they can be "explored" from the surface, and it will thus be possible to find and locate a miner who is pounding. At the Experimental Mine in Bruceton, Pa., a man has frequently been located through 140 feet of cover with 50 feet of the exact point where he was pounding. A study is also being made of the distances that pounding on rails and pipes can be heard. Since rails are generally buried in the earth or dust on the entries of a mine and since that dust damps the transmisison of the sound, the sounds are not transmitted very well. The same is true of pipe lines. However, if pipe lines are not

buried, but are laid on blocks and ties, the pounding can be heard great distances. So far no lines have been found long enough to show the limits of the geophones. It is known, however, that the naked ear can get sounds farther than 2,000 feet.

In metal mines expensive surveys have sometimes to be made in order that approaching tunnel headings may be brought accurately together. Since direction can be determined so well with the geophones, it is thought that they can be used to guide such work. It would simply be necessary to go into each heading and locate the direction from which pounding in the other heading was coming.

It is also thought that they will be of value to prevent accidents, from explosions when breaking through. In this connection an interesting incident happened recently. Observations were being made at a tunnel heading. The pit boss happened along and asked to be allowed to listen. He put the ear pieces in his ears and remarked: "Mack is tamping in a charge, we had better move away." He spoke as naturally as he would have had he been watching Mack, and it is quite evident that he did not realize the sound was coming through 300 feet of coal, else he would not have given the warning.

Observations were made recently of a mine fire burning from 20 to 40 feet below the surface. A low rumbling noise could be heard as if air were being drawn in along crevices, and occasionally sounds could be heard from the snapping and falling of pieces of coal or rock. As well as can be determined, the fire area was accurately located, but owing to the fact that the fire can not be approached from the inside the data can not be checked absolutely. It is interesting to note that similar sounds could be heard from only one point on the inside of the mine, and that that point was the one nearest the area as located on the surface.



J. B. TYRRELL,
Recently elected member of council of the Institute of Mining and Metallurgy.

Ore Receipts at Trail.

Ore receipts at the Trail Smeltery for the week ending March 14th totalled 7,546 tons, which is 2,000 tons greater than were the receipts for the week previous. The shipping mines over the period referred to numbered eleven and there are indications that activity is increasing in the mining sections which may be termed tributary to the Consolidated Mining & Smelting Co.'s great plant. Ore shipments to Trail since the beginning of the year by Districts follow:

Boundary:		
B.C. Mine, Eholt	....	120
Bell, Beaverdell	33	69
Emma, Eholt	891	6,702
Providence, Greenwood	....	40
Totals	934	7,021
East Kootenay:		
North Star, Kimberley	94	1,068
Paradise, Athalmer	88	814
Star Mine, Athalmer	34	34
St. Eugene, Moyie	....	152
Sullivan (lead), Kimbley	784	7,101
Sullivan (zinc), Kimbley	2,976	31,709
Total	3,976	40,878
Nelson and Salmo:		
California, Nelson	48	48
Emerald, Salmo	....	177
Eureka, Taghum	....	134
Jersey, Salmo	....	42
Totals	48	401
Rossland:		
Center Star, Rossland	2,305	21,961
Josie (LeRoi 2), Rossland	263	3,920
Totals	2,568	25,881
Slocan and Ainsworth:		
Arlington, Slocan		509
Eastmount, Enterprise		35
Echo, Silverton		243
Florence, Princess Ck.		606
Cork-Province, Zwicky		30
Galena Farm, Silverton		63
Idaho-Alamo, Alamo		28
Lucky Jim, Kaslo		109
Meteor, Slocan City		35
Molly Gibson, Kitto Ldg.		124
Reco, Sandon		5
Nickelby, Ainsworth		5
Number One, Sandon		34
Pettey, Three Forks		22
Ram.-Cariboo, Rambler		161
Republic, Slocan City		23
Retallack, Retallack		28
Ruth, Sandon		44
Silver Bell, Zwicky		39
Silversmith, Sandon		84
Spo.-Trinket, Ainsworth		92
Standard, Silverton		27
Totals		2,308
American Mines:		
Bonanza, Evans, Wn.		42
Eagle, Newport, Wn.		16
Montana, Mey, F'lls, Wn.		25
Reardon, Clines, Wn.		88

Special Correspondence

NORTHERN ONTARIO.

Will Develop Claims in Gillies Limit.

A company to be known as the Oxford-Cobalt Silmer Mines, Limited, is being organized for the purpose of developing two claims in the Gillies Limit, a few miles south of Cobalt. The Nos. of the claims on which work is to be undertaken are: A-100 and C-1000. The organization of the company is in charge of Mr. J. W. Russell, of Woodstock, Ont., who formerly was connected with the Kerry Company in the development of the Cart Lake Lease. While up to the present time no mines have been developed in the Gillies Limit, favorable formation has been discovered in two sections of the area, and has attracted attention since Cobalt's earliest days. One is the conglomerate area in the most northerly section of the territory, where some rich ore was found in veins in the conglomerate at surface. Values did not prove consistent. The other favorable area is a little farther south, where Keewatin occurs along the diabase sill, on the upper side. It is in this latter area that the property of the Oxford-Cobalt is situated. A number of promising veins are said to occur on the claims, in which cobalt and low silver values have been found.

A Mill for Adanac?

In view of the satisfactory results obtaining at the property of the Adanac Mining Company, Cobalt, the management have under consideration the construction of a milling plant with a capacity of about seventy-five tons per day. It had been formerly intimated that the Adanac might secure the mill of the Temiskaming Mining Company, the adjoining property. The construction of a new mill would eliminate the transporting of the ore to the adjoining property, and make available a larger amount of ore of a lower grade on the Adanac than would be possible providing it had to be transported to the Temiskaming Mill. According to official advice underground operations at the Adanac are said to be favorable. The winze is now down more than twenty feet, at which point good grade ore continues. A considerable amount of high-grade ore has been bagged and a large tonnage of low-grade has been conveyed to the surface dumps. It is stated that the ore after hand sorting, carries an average silver content of about thirty-three ounces to the ton. A number of veins are being worked on, and generally speaking, the results at the property are quite satisfactory.

A Busy Year for Prospectors.

Judging by the large number of mining claims on which assessment work must be performed this season, a busy time is ahead of the prospectors and mining men of the north country during the coming spring and summer. A number of new districts have been extensively staked during the past two years. Owing to the scarcity of men to perform assessment work during the war, many claim-owners have received extensions of time on the performance of their legal duties, with the result that in a great many cases more than the current year's work will require to be done. It is conservatively estimated that between two and three thousand claims are being held in the Temiskaming district upon which it will be necessary to perform the required assessment work this summer, or forfeiture to the Crown will follow. On the average of these claims sixty days' work is required. Providing just 2,000 claims are so situated 120,000 days' work will be required to be performed during the next six months. To accomplish such an amount of work would require about eight hundred men working twenty-six days per month during the six open months of the season. Thus it is expected the coming summer will prove a busy one in the prospecting field and its allied pursuits.

Gold Discovery in Hurricanaw Area.

Reports from the Hurricanaw River district are to the effect that a promising discovery of gold has been made on the Cisco property. This property is situated about one and a half miles from the Martin Gold Mines, the leading operations of the district, and is under option to Montreal interest, who anticipate early exploration.

Burton-Munro.

Work is being conducted on a small scale on the property of the Burton-Munro Gold Mines Company. A test pit is being sunk on the vein, and is now down about twenty feet. The property is situated in the township of Munro, a short distance from the famous Croesus Mine.

Alexo Shipments.

Shipments from the Alexo Mine at Porquois Junction for the third week in March amounted to four cars containing approximately 393,000 pounds of nickel ore. During the preceding week three cars containing 408,000 pounds were shipped from the property. The total amount of ore shipped during the first three weeks of March amounted to 1,111,000 pounds. The ore is taken to Sudbury for treatment.

Elliott-Kirkland.

Work is being held in abeyance at the Elliott-Kirkland property for a short time, while plans for a further programme of exploration and development are being mapped out. This property adjoins the Kirkland Lake Gold and the shaft has been sunk to a depth of 500-feet. Considerable diamond drilling has also been carried out on the property.

Will Develop Properties in Gowganda Area.

According to reports from Gowganda, preparations are being made to do considerable development work on a number of properties which have been in idleness for some time. Among those mentioned as likely to resume operations right away is the Reeves-Dobie. A small steam plant is being taken in to the Collins group of claims situated about six miles east from the Miller Lake-O'Brien Mine. The Hudson Mining Company of Cobalt is reported to be making arrangements for the re-opening of their property here in the near future. The annual meeting of the Silverado Mining Company was held at Cobalt this week. A small gang of men are working at the property, and will be added to with the advent of warmer weather. The next few months promise extensive enlargement of the active mining operations in the Gowganda camp.

Three Mills in Operation at Kirkland Lake.

Three mills are now in operation in the Kirkland Lake camp, and generally speaking the Kirkland Lake field is taking on a very business-like appearance. The milling plants now operating include the Lake Shore, Teck-Hughes and Kirkland Lake Gold Mines. Within the next two months it is expected the Tough-Oakes will have its mill in operation, and by mid-summer all four mines should be producing at full capacity. The installation of the 150-ton milling plant on the Wright-Hargraves should also be in an advanced stage by the end of August, while it is only a matter of time until installation of a mill will become necessary on the Kirkland-Porphyry, which will make a chain of more than two miles of producing mines.

The Dome Re-opening.

Mining interests both large and small are looking to the re-opening of the Dome Mines at Porcupine, with expectations perhaps never before exceeded in the history of the mine. In view of the fact that the Dome is recognized as a large low grade mine, it is obvious that in treating a large volume of ore daily, lies the only means of realizing the full benefits of operation. With the large amount of ore broken in the shrinkage stopes of the mine ready for hoisting to the mill it seems highly probable the plant will soon be operating at full capacity. According to the last report of the company approximately 400,000 tons of ore of an average value of $5.10 per ton was already broken ready for hoisting to the mill for treatment. Since this time, further development has taken place and a large crusher has been installed at the 800-foot level, which should add greatly to the efficiency in handling the ore. Considerable diversity of opinion exists as to the policy of operation to be followed on recommencement of milling operations. In some quarters it is thought the mill will not be brought up to full capacity before late summer, while others are of the opinion that capacity production will be reached within a few weeks of re-opening, and some contend that previous production records may possibly be exceeding with the improvements inaugurated at the property during the period of suspended milling operations. Numbers of old employees who left the Dome when work was curtailed are being offered thei rold positions, and invariably they are requested to report for work by the 15th of the current month. The avowed policy of the president of the Dome to keep the shareholders advised as to important developments bodes well for the future. The mine stands out as one of the bright spots in the gold mining industry of this country, and present indications are that upwards of five hundred men will be working at the property within the next few months.

Dome Lake Mill Again in Operation.

The mill at the Dome Lake Mines, Porcupine, resumed operations again this week, according to advice just to hand. It is expected the average tonnage treated in the mill will show an increase from this date forward, and will possibly exceed the average accomplished before the closing of the mill some time ago. Underground developments at the property recently are said to have been of a very satisfactory nature.

Interest in Larder Lake Area.

Several of the mining companies of the Cobalt district are interesting themselves in the Larder Lake Gold Area. This is apparent in the fact that a large number of claims have been staked by representatives of these companies recently. The possibilities of this district have always been conceded to be worthy of further investigation, it being realized that initial exploration and developments in the area were of a very superficial character, insufficient work being accomplished to prove the merits of the various properties. The Goldfields Consolidated Mining Company's operations are the most important in the district to date, and it is reported encouraging results are being met with in development there.

Will Drill at Haileybury.

Much interest is being manifested in the operations of a diamond drilling machine which has been set up just west of the Temiskaming and Northern Ontario Railway tracks at Haileybury, where it is proposed to drill for oil.

Arnold-Hughes Claims Sold.

Another big deal was closed this week for property in the Boston Creek gold area, when a group of three claims owned by Dr. Arnold and J. A. Hughes, both of Haileybury, changed hands. The claims are situated in Catherine township, and adjoin the Cotter property on the latter, of which the eastward extension of the rich Miller-Independence vein has been discovered. The purchaser, Mr. Savage, of Buffalo, will make substantial payments at intervals of ninety days. A payment was made on the signing of the option agreement, which is to go towards immediate exploration and development work. A company is to be formed for the purpose of completing the payments and carrying on development work. This deal forges another link in the chain of properties which are gradually being acquired by strong interests in the vicinity of the Miller-Independence. The northeast corner of Pacaud, together with the northwest corner of the township of Catherine and McElroy, and the southeast corner of Boston township comprise the chief area of present activity in the new mining field.

Indications point to the possibility of activity spreading far into Catherine as well as northward into the ownships of Boston and McElroy. These four townships are the area commonly known as the Boston Creek field.

Washington Smelter Closed Down.

The closing down of the Northport, Wn., smelter is a matter of considerable interest to the mine operators of the Boundary District of British Columbia. There is a belief among some Canadian mining men that this action is the result of an understanding with the large smelting interests of America. One newspaper of the Provincial Interior observes: "The West Kootenay Light & Power Company recently completed an expensive line from Trail to the smelter at Northport in order to sell power to the plant, but it is likely that the big Canadian power concern took good care to protect itself against any such contingency as that at present existing."

BRITISH COLUMBIA.

Will Resume Operations at Anyox Smelter.

Preparations are being made by the management of the Granby Mining & Smelting Co.'s plant at Anyox, B.C., for the resumption of operations. The smelter, it will be recalled, closed down several weeks ago when fire destroyed a small part of the equipment. The men also had refused to accept the company's proposal for a reduction of wages, the same to be placed on a sliding scale which would advance or decline with the fluctuations of the price of copper. The plant now is ready for work again but, in the meantime, the majority of the workmen have left the town to look for employment elsewhere. The management, therefore, is looking for men in Vancouver, Victoria, and other provincial cities, it being advertised that 1,200 are required and the preference will be given to returned soldiers. It is not thought that there will be much difficulty in securing the number of workmen needed, and the expectation is that work will be resumed very shortly.

Testing Laboratories for British Columbia.

The announcement that the Dominion Government is making provision in this year's estimates for the expenditure of $100,000 on one or more ore testing laboratories in this Province is welcomed by mining men. This is something for which British Columbia operators have been agitating for years. At present it is necessary to send ore which it is desired to have tested to Ottawa, thus involving expense and considerable loss of time. With facilities at hand those engaged in putting properties, especially of the complex ore bearing character, on a shipping and paying basis will find readily available the means of obtaining necessary information.

Renewed Activity in Yukon Gold Mining.

Klondyke operators are preparing for extensive dredging and hydraulic work this year, according to reports from Dawson. It will commence about May 1. It is thought likely that the output of $2,000,000 in gold will be considerably exceeded this season, as some of the larger companies, which have been tied up by litigation and the work of re-organization, are planning to resume operations. It is estimated that fifty creeks of proved value remain in the Dawson district. The Canadian Klondyke Company's dredge No. 4 worked every day last winter and is going full blast still, which is considered a remarkable feat under semi-Arctic conditions. The Mayo Silver Camp is said to be proving up very satisfactorily and those from that section optimistically declare that it is destined to rival Cobalt.

A Placer Gold Discovery Above Marshall City.

E. W. Parks, owner of a quick-silver mine in the Yukon, arrived from the north a few days ago, and reported that a placer strike had been made above Marshall City, and a short distance beyond Holy Cross on the Yukon River. Mr. Parks states that he met a number of prospectors who have stampeded to the new diggings and that they report 50 cent pans as common there. The creek on which these placer claims are situated, and which ground is said already to be completely staked, runs into a slough of the Yukon River.

Will Drill Aspen Grove Properties.

Four standard diamond drill outfits have arrived at Thelia on the Kettle River Valley Railroad, Kamloops District, and will be taken to the property of the Aspen Grove Amalgamated Mines, Ltd., for exploration purposes. Mr. Joseph Errington and associates are representing the bond holders, and active extensive work is promised for the coming season. The property comprises some seventy-five claims on which considerable development work has been done. It is said that should the drilling results prove satisfactory the capital necessary for the further opening up of the property, to the end that it be placed on a producing basis, will be immediately available.

Nechaco River Mines, Inc.

Promising reports have been received from mine properties situated on Stone Creek about twenty miles south of Prince George, B.C., where the Nechaco River Mines, Inc., a New York Syndicate, has been carrying on development work for the last two years, its property being known as the Yellowjacket Group. From the quart zformation near the main lead an assay has been obtained showing values of $27 a ton in gold, silver and lead. The statement is made of this property that there are thousands of tons of the same formation on either side of the main and richer body of ore which could be loaded on cars by a steam shovel. The Yellowjacket Group lies about four miles east of the Pacific Great Eastern Railway grade and adjoins Stone Creek Canyon. William West is in charge of development work at present, but expects an engineer from New York to look over the ground and decide upon a plan of operations at an early date.

Examining Property of Kitselas Mountain Mining Co.

The Kitselas Mountain Mining Co., which has a gold property situated near the town of Usk on the Grand Trunk Pacific Railway, is negotiating for its sale to a syndicate of North Dakota capitalists.. Representatives of the latter recently made an inspection of the prospect, took samples, and the character of their report will determine the results of the negotiations.

An Opportunity for Placer Miners.

W. A. Phair, a pioneer placer miner of British Columbia, at present resident at Lillooet, offers a striking solution of the question of employment for returned soldiers during the reconstruction period. "During this period of depression," he says, "it seems to me that some of those in the city who cannot find employment for the moment could, at least, make a living by placer mining along the Fraser River. During the depression, about 1896, I can remember seeing the banks of the Fraser lined with Chinese and Indians with rockers and pans. They used to make at least a dollar a day with a chance of striking a pocket. They used to work several months each year. During the low water periods of March and April there are great chances to get down where the river has not been worked and when a pocket is struck it generally means several thousands of dollars. A few years ago Indians took out a lot of gold just above the town of Lillooet. I know several averaged over $30 a day for some weeks. If several prospectors got together they could wing dam parts of the river with the chance of big money. Then there are several new gold-saving devices which might be used to advantage."

Canada Copper.

The Napoleon Mine in the State of Washington has been dismantled by the Canada Copper Corporation. A 5,000-foot tramway of the Bleichert aerial type, has been moved to the Mountain Chief Mine at Ranea, where it will be installed for early use.

Echo Silver-Lead Mine is Now a Steady Producer.

The Echo Silver-Lead Mining Company, which operates near Silverton, B.C., has entered the list of continuous producers. Four carloads of silver-lead concentrate are produced monthly. The silver-lead concentrate contains 65 per cent lead and 125 ounces of

silver to the ton, and the zinc concentrate 40 to 45 per cent zinc and 60 ounces of silver to the ton. The zinc concentrate is being banked at the mill for lack of satisfactory market for zinc products. The Echo mine is equipped with a two-bucket tramway that is connected with the Standard tramway by which ore deliveries are made to the Standard Mill, where the concentrating is done.

Will Re-open Highland Valley Mine.

F. Keffer, manager of the Highland Valley Mining and Development Company, states that this property, which is situated in the Ashcroft District of the Province, will be re-opened and probably placed on a producing basis this summer. The mine is well equipped, possessing a concentrating mill. The necessary capital having been interested, Mr. Keffer looks forward to a season of activity and who states that "we expect to begin work as soon as the snow goes, and push it for all it is worth."

The Smelter Rates Investigation.

The committee of investigation into charges made by the Slocan lead-silver-zinc shippers against the management of the Trail Smeltery in respect of the latter's custom smelting rates is reported to be making good progress in its work. A number of meetings have been held and evidence taken from those directly affected on both sides. Information also has been secured from officials of the smeltery. The preparation of the report is the chief task now before the Committee, and in this it is stated that the assistance of Mr. E. R. Whittaker, who conducted the Colorado State Investigation, will be available. It is not expected that the report will be ready before the lapse of two or perhaps three months.

Killed by Snowslide.

Two men of the Surprise mine force, who were employed on trail work, lost their lives recently when a snowslide caught and swept them into oblivion. They were William McKnight, a Scotchman, and Joe Sesil Sonr, an Austrian. Both were about 35 years of age and married. The scene of the fatality was near the Noble Five Mine, near Sandon, B.C.

Nugget Gold Mines, Ltd., Will Operate Sheep Creek Mines.

The Nugget-Motherlode-Searchlight Group of claims on Sheep Creek have been brought under control of a British Columbia syndicate which has been incorporated as the Nugget Gold Mines, Ltd. The property, it is stated, is to be actively developed and placed on a producing basis with as little loss of time as possible. Mr. R. H. Stewart, M.E., one of the best known of Provincial Mining Engineers, will supervise the work. In acquiring the Motherlode the new operators not only have a promising property, but have secured a ten-stamp mill of South African type, which was built by the Fraser and Chalmers Company of London in 1912. It includes a cyanide plant and is said to be one of the most complete mills of its size in the province. Those interested in the project look forward to developments with confidence. They state that it has long been evident that the only economical way to operate on Sheep Creek was to amalgamate several groups of claims and treat the ore at a central mill. This has been accomplished. The Nugget, Searchlight and Motherlode groups, with the mill on the latter property, found, it is said, an ideal mining and milling aggregate. The Nugget and Searchlight occupy the summit of the mountain, at an elevation of 5,500 to 6,000 feet above the sea level. The Motherlode mill is at the foot of the south slope of the mountain on the main fork of Sheep Creek, at an elevation of about 4,000 feet, so that there is a vertical depth of 2,000 feet of "backs" above the mill which can be worked by adits, enabling the property to be economically worked.

Portland Canal District.

The Portland Canal District, northwestern British Columbia, is going to be heard from this summer, according to a number of prospectors and operators from that section. No one, however, is more enthusiastic than R. W. Martin, of Seattle, Wn., one of the owners of the Mineral Hill Group of Claims situated above the Bush Mine, of which great things are expected this season. Mr. Martin looks for the completion of a wagon road to his and other adjacent properties in the course of the next fe wmonths and states that, with this done, considerable shipments of high grade ore will be made.

Expects Decrease in Coal Production.

"This year coal mines of the northwest will not operate 40 per cent of the time, which means a heavy expense for operators," stated James S. Ramage, head of the Continental Fuel Company, and the Hawkeye Fuel Company, recently in Spokane, Wn. "For some time," he continued, "there has been serious over-production of coal in Canadian and other districts from which Spokane City receives its supply, About 80 per cent of the steam coal used here comes from the Canadian mines, and a serious situation has developed in that country as is evident by a recent report issued by the Workmen's Compensation Commission, making the definite statement that cost of labor in producing coal is $2.60 a ton, which is above previous calculations and more than in other fields with which Canada competes."

The Coal Situation in Alberta.

As to the situation in western Canada in regard to coal production and trade it is interesting to note the comments of Premier Charles Stewart, of the Province of Alberta, made recently to the Legislative Assembly of that Province. He pointed to the stored up surplus of 2,000,000 tons of coal and admitted that the position was a serious one, especially with the embargo taken off American coal and with production costs at a high level. The Premier declared that the only solution of the problem was the reduction in the price of coal to the extent of at least $2 a ton in order that American competition might be met. This reduction, he said, had to be achieved by cutting the price of production, though some slight decrease might be attained in freight rates. He believed that the difficulty might be remedied at least in a degree by lengthening the time of production, assuring the miners of steady work for a period of eight months in the year, instead of but six months as at present. While Premier Stewart declared that he was against cutting wages, his remarks led to the conclusion that, with the lengthening of the period, the miners' daily wage would have to come down. He virtually admitted, however, that the Alberta Government was helpless in face of present conditions.

Work has been resumed at the Diamond Vale Coal Mine, Merritt, B.C.

Coal Prices at Prince Rupert.

During the past winter the City of Prince Rupert has been complaining bitterly of the cost of coal to its citizens. The question has been discussed by the councillors of the community regularly without achieving much in the way of results. At any rate, it has been found impossible as yet to obtain such reductions in the price of coal at Vancouver Island mines, together with handling charges, to bring the ultimate cost to the consumer below the figure at which the fuel stood, per ton, at

the outset. Several weeks ago, however, Prince Rupert had her chance. The Fuel Control Board of the City Council recommended the purchase of 1,800 tons of coal from the Coastwise Barge & Steamship Company, at Vancouver, B.C., the same to be delivered alongside the dock at Rupert at a cost of $7.00 a ton. Theer can be no doubt that, making the most liberal allowance for handling charges from the barge at the dock to the cellars of the consumers, the latter would have been able to get the fuel considerably cheaper than the $12 a ton, and more, which they have been paying. But the City Council, when confronted with the straight proposition, declined the responsibility. The tying up of $15,000 of the city's money, even for a brief period, did not commend itself to the civic solons and the Committee's recommendation was vetoed. It would seem that, after all, the directors of Prince Rupert's destinies have come to the conclusion that there is a proper and useful niche in the life of the municipality for the coal dealer who, on the Pacific Coast of late, has been receiving some pretty hard knocks.

Litigation Over Coal Lands by Nanoose Collieries.

There has been litigation during the past few weeks over title to the coal fields of Vancouver Island controlled by the Nanoose Collieries, Ltd., suit being brought against the Company by A. F. Eastman, manager of the Marble Bay Mines, Texada Island, for an accounting and for an order restraining further work on the property. His claim was that in 1906 he had entered into an agreement with the then owner of a portion of the property now under development to provide money for opening up the coal measures supposed to be there in return for a half interest. Work started on this basis, a small seam was struck not far from the surface, and then a disagreement arose with the result that operations were suspended. Mr. Jack subsequently died. His executors, according to Mr. Eastman, declared that the estate would sell its interest for $60,000, whereupon Mr. Eastman et al arranged to dispose of the entire holdings to Alvo von Alvensleben, the German financier and propagandist of which considerable has been heard both in Canada and the United States of late years, for $125,000. This, however, was not accepted by the Executors and Alvensleben bought the Jingle Pot Mine, near Nanaimo, B.C. Finally the property was sold out to the Nanoose Collieries, Ltd. The reply to Mr. Eastman on behalf of the company was that his agreement with Mr. Jack was to the effect that he should have one half of the returns of coal produced during the active operation of the partnership. The Court upheld the Company and the action was dismissed.

British Columbia to Recompense Sufferers from Riots.

An echo of the Vancouver Island coal miners' strike of 1914 was heard in the British Columbia Legislature during the closing days of the last session when Premier Oliver moved that members of the House should go into Committee of the Whole to consider the advisability of settling the claims of those who suffered through damage to or loss of property because of the riots which occurred on that occasion and, if favorable thereto, that leave be granted to introduce legislation to that end. The resolution was carried; the discussion developed that the opinion was unanimous that the Province was obligated to make proper recompense to the sufferers; and the necessary Bill was introduced and passed without loss of time. Mr. Justice Gregory, of the Supreme Court, it should be explained had been appointed a Commissioner by the late Government in 1916 to hear evidence and decide on the amount due to each of the petitioners and his report, which was presented and on which payment will be based, indicates that the total sum to be thus disbursed is $56,878.

Premier Oliver, in moving the resolution, explained that personally he did not think the Province was legally responsible for the payment but he thought there must have been some object in having an inquiry made and that the then Government, in ordering one, contemplated payment of claims approved by the Commissioner. He felt that it was a matter for the Legislature to decide and that was why, as Leader of the Government, he had brought the matter to the House in order that it might give expression to its views.

There was considerable debate. One member suggested that, inasmuch as the Dominion Government had recognized its responsibility by the calling out of the Militia in order to quell the disturbance, it seemed that that Government might be held responsible for the damage to property. For the Province to pay would be the establishment of a bad precedent. W. J. Bowser, the Premier at the time, declared that, whatever might be the legal responsibility of the Province, he certainly thought there was a moral one, while J. H. Hawthornthwaite, member from one of the coal mining sections, stated that he had "butted" into the troubles in the effort to efect settlement, but the miners had been badly advised and the riots resulted. The Province had control over civil rights and property and must protect them. He was convinced that the Government should shoulder the responsibility for the payments.

Hon. Wm. Sloan, Minister of Mines, believed the responsibility for the trouble lay with some 200 agitators who came over from the State of Washington and inflamed the miners. Application had been made to the then Government for protection, but it was not forthcoming until after the damage had been done.

As a result of the passage of the measure the claimants will be paid forthwith.

Nicola Valley Coal.

For a number of weeks the Merritt (B.C.) Board of Trade has been investigating the coal situation as it affects the Nicola Valley Coal field with a view to the presentation of arguments to officials of the Canadian Northern Ry. Company to the end that the latter concern may be persuaded to use Nicola Coal in the operation of the inter-mountain divisions of their railroad. At the present time the fuel used comes from Brule Lake, Alberta, and Vancouver Island. President Hanna, of the C.N.P.R., is visiting the Coast and advantage is being taken of the opportunity to have a deputation of the residents and coal operators of the Nicola-Princeton District wait upon him with respect to the matter.

Amendments to B.C. Coal Mining Regulations.

The amendments to the Coal Mines Regulation Act, introduced to the Provincial Legislature at the session just closed by Hon. Wm. Sloan, Minister of Mines, passed with no very material change. One alteration, however, was permitted, namely, that the Minimum Wage Section, which authorized the Minister of Mines to define any particular coal mining section and to declare it a minimum wage district, shall not come into effect until July 1920. Thus the coal mine operators are given a year before this law can be applied. As it is thought that this legislation is aimed at the Chinamen employed as miners at the face in some of the mines of the Province, it is possible that the condition which gives, allegedly, rise to this part of the Act will be non-existent before the lapse of twelve months. It fol-

lows that there is a possibility that the Legislature may decide ultimately that it is unnecessary and may be expunged. However these are but surmises and the probability is that, with the consensus of opinion being in favor of a minimum wage under any condition, that the measure will remain on the Statutes and be applied when found advisable.

It is significant, in this connection, that notices have been posted by the Canadian Western Fuel Company at its mines in the Nanaimo District informing employees that from the 1st of April the price of coal to them will be $4 a ton. They have been getting it for $2.50 a ton. This advance was necessary, the announcement stated, owing to the decision of the company to make Nanaimo a white man's camp by replacing Orientals now in the company's employ by white men who, owing to advanced age or injuries, were unable to continue their regular employment underground.

The Tax on Coal.

At one time during the recent session of the British Columbia Legislature the coal mine operators of the Province were disturbed by the report that it was the Government's intention to increase the per ton tax on coal produced from 10 cents to 25 cents. Representations of a very strong character were made against any such impost, it being contended that it would make the costs so high as to render it impossible for British Columbia coal to hold its foreign markets, chiefly those of the States of Washington and Oregon. The Legislature has prorogued and the minds of the operators are relieved as, while an amendment has been made to the Taxation Act affecting them, nothing so radical as was suggested has been placed on the Statute Books. The tax for years has been 10 cents per long ton on all coal shipped, exported, or delivered from the mines of this Province, excepting that which goes to the coke ovens. To take care of the latter there is a supplementary clause taxing coke at the rate of 10 cents a long ton. The amendment referred to makes the coal mines or collieries liable to pay either the 10 cent Royalty described or to pay on their income, the Crown having authority to collect on whichever basis yields it the greater revenue.

MARKET PRICES OF SHARES.

The following are prices for Saturday, April 12th, on the Standard Mining Exchange, Toronto.

Standard Stock Exchange.

	Ask.	Bid.
Gold—		
Apex	3½	3¼
Baldwin	34	33
Boston Creek	30	20
Davidson	66	65
Dome Extension	29½	28½
Dome Lake	26	25
Dome Mines	15.00	14.25
Eldorado	2	..
Gold Reef	3⅞	3¾
Hollinger Con.	6.35	6.25
Inspiration	9	8½
Keora	18	16
Kirkland Lake	49	48
Lake Shore	1.02	1.00
McIntyre	1.68	1.67
Moneta	10½	9
Newray Mines	..	16
Porcupine V. & N. T.	23½	21½
Porcupine Crown	29	28½
Porcupine Gold	1	
Porcupine Imperial	1⅞	1¾
Porcupine Tisdale	2¾	2¼
Preston	4	3½
Schumacher Gold M.	37	34½
Teck-Hughes	21¾	..
Thompson-Krist	8	7½
West Dome Con.	14¾	14½
Wasapika	62	60
Silver—		
Adanac	18½	18⅛
Baily	4½	4
Beaver	44	43½
Chambers-Ferland	10½	9½
Coniagas	2.55	2.50
Crown Reserve	45	41½
Foster	4½	4
Gifford	3	2¾
Great Northern	4	3¼
Hargraves	3	2½
Hudson Bay	55.00	45.00
Lorrain	2¼	1
La Rose	..	29
McKinley-Darragh	49¾	48
Mining Corporation	2.15	2.00
Nipissing	9.50	9.05
Ophir	10½	10¼
Peterson Lake	8⅛	7½
Right-of-Way	3½	3
Silver Leaf	2½	2⅜
Seneca-Superior	2	..
Timiskaming	33½	33
Trethewey	39	38½
Wettlaufer	..	5
York, Ont.	2	..
Miscellaneous—		
Vacuum Gas	8	7½
Rockwood	8	6

Standard Sales—April 12.

Gold—	Open.	High.	Low.	Clos.	Sales.
Baldwin	33½	..	33	..	1,000
Davidson	66	..	..	..	1,000
Dome Ex.	28	29½	28	29¼	6,000
Dome Lake	27	..	25½	..	7,450
Dome M.	14.50	..	..	..	80
Gold Reef	3¾	4	3¾	3⅞	3,500
Holly Con.	6.30	..	..	..	1,030
Kirk. Lake	48½	49	48½	49	2,000
Lake Shore	103	..	101	..	1,700
McIntyre	167	..	..	..	1,649
Moneta	10	..	..	..	1,000
Newray. M.	16	..	..	..	1,000
P. Crown	29½	..	29	..	1,000
P. Imperial	1¾	..	..	..	2,000
P. Tisdale	2½	..	..	..	500
Preston	4	..	..	..	1,000
Schumacher	37	..	..	..	1,000
Teck-Hughes.	22	23	22	..	4,200
T.-Krist	7¾	..	..	..	2,000
V. N. T.	24	..	23	..	6,000
Wasapika.	60	61½	60	61½	2,500
W. D. Con.	14½	..	..	..	2,000
Silver—					
Adanac	18¾	..	18½	..	2,500
Beaver	43¾	..	..	..	500
Gifford	2¾	..	..	..	7,000
La Rose	28	..	..	..	150
Min. Corp.	2.05	..	..	..	150
National.	11	12	11	12	1,000
Ophir.	10½	11	10½	..	14,000

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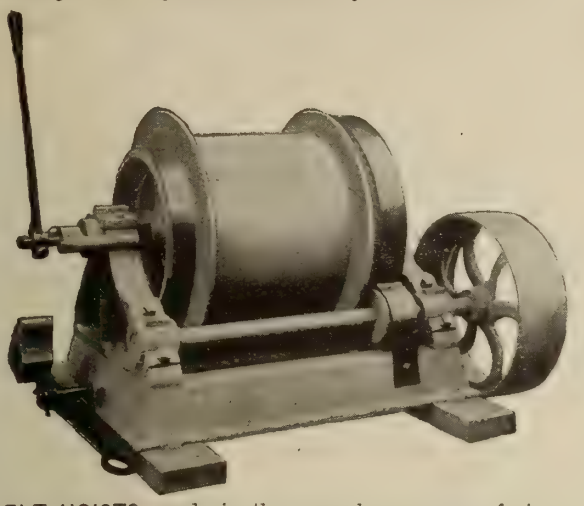

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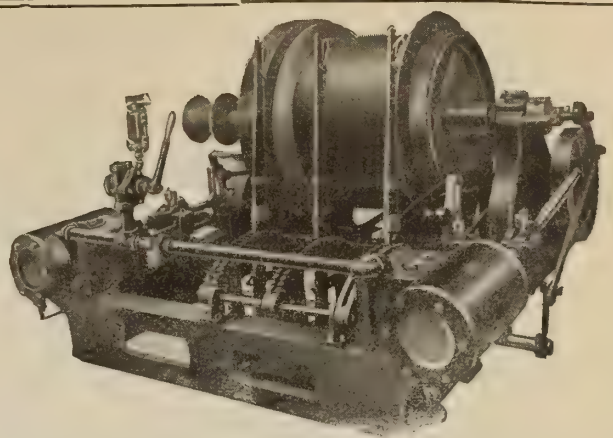

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Kirkland-Porphyry.

Development work on the Kirkland-Porphyry property at Kirkland Lake to a depth of 400-feet has opened up a large tonnage of high-grade ore. Visible gold occurs quite freely, and the mineralization is said to be very consistent. A crosscut is being driven south at this level for the purpose of encountering the westward continuation of the No. 1 vein, or the south orebody of the Lake Shore Mine. If success is met with in this development and commercial ore be found to occur in the vein, it would prove of extreme importance to the Kirkland-Porphyry. It might also prove of considerable importance to the Kirkland Lake Gold property which adjoins.

La Rose Developing Princess Property.

Quite satisfactory results are said to be attending development work on the old Princess property adjoining the McKinley-Darragh Mine, and being operated by the La Rose Mining Company, Limited. According to reports the new vein opened up early in the current year on the McKinley-Darragh, and which was found to be running in the general direction of the Princess, was found to have terminnated before the boundary was reached. A considerable amount of rich ore came from the Princess in the early days of the camp, and with the present high price of silver as a stimulant to encourage exploration the La Rose mining company is carrying out a development program, which is being rewarded with a fair amount of success. Reports in well informed circles here are to the effect that a vein was recently uncovered at the 200-foot level of the old La Rose property, from which a considerable amount of high grade ore is being obtained, while the wall rock on both sides of the vein is said to carry milling ore for several feet. The high grade streak is said to be about six inches in width. Work is still being energetically prosecuted at the Violet property of the La Rose mining company, and satisfactory results are said to be attending with further opening up of the valuable orebodies. A large amount of good grade milling ore has been opened up, and the orebody has been proven to persist to a depth of 475 feet in a winze which was sunk to this depth from the 410 foot level. While official announcement of the date set for the hearing of the dispute between the O'Brien and the La Rose, concerning the boundary line of the two properties, has not been given out, persistent rumors are current in the camp that the case is to come up about the fifteenth of the month. While much importance is attached to the outcome for both companies concerned, the decision is not vital to the future of either company.

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CHAIR OF MINING.

The Governing body of the Imperial College are now prepared to receive applications for the post of Professor of Mining in the Royal School of Mines, shortly to become vacant. The new Professor will be required to take up his duties in September, 1919.

The Rector of the College will be glad to afford further particulars.

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:-: EDITORIAL :-:

WILDCATS SHOULD BE MUZZLED.

Contrary to outward appearances, and despite the silence of public comment, conservative mining interests are not altogether pleased with the outcome of recent attempt of the Ontario Government to devise ways and means of combating the prostitution of the mining industry of this province by a few modern pirates Obviously, according to unanimous opinion throughout the mining districts, the "Sale of Shares Act, 1919," was most decidedly not the remedy, having the affect, as it probably would have had, of interfering with the earnest efforts of all mine operators no matter how sincere. However, in spite of this one failure to find the proper solution, the opinion is being quietly expressed among mining men that the matter should not be permitted to drop, and that the opposition raised in Northern Ontario should not be misinterpreted as signifying opposition to the principle of the measure.

When, early in the present year it became known that legislation was being considered, aiming at the protection of the public, the captains of industry as well as all the decent thinking people of the whole of Northern Ontario believed the Government had at last decided to no longer disregard the flagrant abuse of one of the basic industries of the country. Heads which had been bowed almost in shame at the Governments previous inaction in this respect raised their eyes to greet this flicker of hope. Then came the full text of the bill, which was followed by one of the greatest waves of resentment of its kind ever experienced in the North. The bill would confer power upon a commissioner to judge whether or not any particular proposition promised a "fair return on shares to be offered for sale," a power which no man has yet been able to develop and which is the fundamental fact in placing unusual value upon the precious metals.

The contention has been put forward that laws already in the statutes are adequate to protect the public, but that these laws have been frequently disregarded by wildcat promoters, and the powers with which the authorities have been possessed have not been exercised, and that the abuse of the mining industry has been due partly to the unscrupulous promoter and partly to the failure of the authorities to fulfil its obligations to the public.

The suggestion has been offered that mining promotions should be placed under the jurisdiction of the Bureau of Mines. The suggestion appears to have been met with a good deal of favor. Through the Minister of Mines, the Mining Commissioner, the various mining recorders in all parts of the province, the staff of geologists, and through constant touch with sincere mining men it would not be difficult to arrange the necessary machinery to successfully cope with wildcat promotions. After all a so-called wildcat (except in oil drilling parlence) is but a piece of territory upon which there may or may not be possibilities of success, but which is promoted in such a manner as to permit its promoters to pocket a large portion of the money subscribed by shareholders, and leave only a portion to go toward development work as a means of covering their tracks.

For any one individual to attempt to find a remedy, would appear to be very unreasonable, very unfair to the industry and an injury to the country as a whole. There should first be a report expressive of expert opinion from all angles and compiled by some such an organization as the Bureau of Mines.

In a word, legitimate operators do not wish to be placed at the mercy of any politically appointed commission, or, as a matter of fact, at the mercy of any commission. At the same time, genuine operators express the sincere wish that misrepresentation should be made punishable by law. By this route lies at once, protection for genuine effort and punishment for the wildcatters.—J. A. McR.

TUBE MILL LININGS.

A new tube mill lining has been brought to our attention, which promises to remove a great deal of trouble and annoyance from the operation of this mill. Up to the first year of the war the Silex lining had been almost universally employed and when properly installed this lining gave fair satisfaction. The war, however, shut off the supply of Silex and there does not appear to be any prospect of this material being available for some years yet, and recourse has been had to chilled iron lining plates, but these are far from satisfactory.

The problem was attacked by Mr. F. B. Kilbourn, of Montreal, and he evolved an entirely new idea in linings, which he has successfully patented. This lining consists of a series of special chilled iron T-bars set on edge round the tube mill and spaced from ¾" to 1" apart. The spaces between the bars are filled with a rich cement grout and when this is set the tube mill is ready for operation. After a few hours running the concrete between the bars is worn out somewhat, leaving the bars protruding. The appearance of the mill can be seen from the illustration which shows the corrugated affect of the bars protruding beyond the concrete filling; this corrugation has the effect of positively driving the contents of the mill. Users of tube mills are quite aware of the fact that with the Silver or chilled iron plate lining there is a great deal of slipping of the contents, which not only wastes power, but reduces the efficiency of grinding very greatly.

We understand that many tube mills have now been equipped with this new lining and the results attending their use exceeded expectations. The first mill so equipped was shut down after 5,000 hours of operation and the wear checked up. A careful record has been kept of the original internal diameter and measurements after the mill was taken out of commission showed a wear of only ⅛". The illustration shows this particular mill after having run for 5,000 hours. As the wearing depth is two inches the life of this lining would be 80,000 hours, or over nine years con-

tinuous operation. The small amount of wear shows that there can be very little slipping of the contents and that the claim of positive drive is fully justified.

Another feature that should be noticed is the uniformity of the wear. As is well known a chilled iron plate wears in grooves and holes and a plate has to be discarded on that account and not on account of uniform reduction in thickness. Another feature is that no bolts are required and the trouble and annoyance from this cause are removed.

We understand that Messrs. Burnett & Crampton, at Rigaud, Quebec, have been appointed sole manufacturers and selling agents for Canada for this lining. This is a comparatively young concern and they appear to be in the field to turn out the highest grade of castings. They inform us that they have had considerable success with chilled iron and also with high grade machinery castings. Both partners in this firm are engineers and, therefore, appreciate an engineer's requirements in grey iron.

GOVERNMENT EXPLORATION FOR MINERALS.

The secretary of the Canadian Mining Institute, Mr. H. Mortimer-Lamb, has recommended that an endeavor be made to interest Federal and Provincial authorities in his scheme for governmental exploration for minerals. It is to be hoped that some way will be found to speed up prospecting and Mr. Lamb's scheme has the advantage at this time of affording employment to returned men.

Under this scheme, officers of the Department of Mines would be in charge of prospecting areas. The prospecting parties would be under the leadership of mining engineers. The men would be paid by the Government. Discoveries would be examined by officers of the Department of Mines and there disposed of to operating companies. Of the monies realized from the sale of properties 75 per cent. would be retained by the Government, and the remaining 25 per cent. would be divided among the members of the party responsible for making the original discovery.

In our opinion some such scheme should be given a fair trial. There are obvious difficulties to be encountered, and unexpected ones will doubtless crop up; but one important discovery would possibly make the experiment quite worth while.

To assist technical, professional and business men returning from overseas to secure suitable employment a special section has been established by Department of Soldiers' Civil Re-establishment. Major George C. Riley, of Montreal, a member of the Canadian Mining Institute, will be in charge of the work. Major Riley will doubtless be pleased to hear from any operator who needs technical men.

The decision to engage an assistant secretary is another sign that the Canadian Mining Institute is growing and that it intends to do something this year. One of the advantages will be that the secretary will be able to visit branches more frequently without causing accumulation of work at headquarters.

H. W. Appleton, formerly with Robert W. Hunt & Company, and recently Works Manager, Toronto Plate Glass Importing Co., has joined the staff of Burns & Roberts, Ltd., railway and contractors' equipment, Toronto.

THE FREEHOLD SYSTEM.

To the Editor of the Canadian Mining Journal:

Sir,—In connection with the discussion regarding the holding of mineral areas by freehold as against leasehold, there is one phase of the subject that I do not think has been sufficiently emphasized, that is the opinion of those most directly interested: the prospector and the purchaser. A canvas of these interested parties would show that about 101 per cent are in favour of tenure by freehold. This opinion is easily understood. Ownership is necessary to any exchange. If all the prospector has to sell is ownership of a lease of a property, every day that he retains the ownership of this lease, lessens its value. The purchaser, on the other hand, feels that he is not purchasing the full possibilities of the property—he is only purchasing the right to make a profit out of the property for a limited time. This will lessen the valuation placed on prospects and lessen the expected profits from operation, tending to discourage both prospector and purchaser. Even a long-term lease with the promise of a renewal of lease will not overcome this, because ownership of a lease of a property can never be as valuable as actual ownership of the property, unless the lease be in perpetuity, when it is the same as freehold. Again, it must not be forgotten that many mining men do not consider that the promises of even Governments are inviolate.

The stock argument in favor of leasing is that the mineral resources of the country belong to all the people and should not be alienated; that the people should control their natural resources. This argument may be correct for agricultural lands, for timber lands, for water powers and for fisheries, for these natural resources, if intelligently handled and wisely conserved, will continue to produce food, timber, power and fish forever. But the mineral resources of a country cannot be used without becoming exhausted. A mineral will not reproduce itself, and the first pound of ore hoisted from a mine marks the beginning of the end.

The leasing system would be more wasteful and tend to more rapidly exhaust the mineral resources of a country than the tenure by freehold. If a company had only ten or twenty years in which to operate a mineral deposit they would make every effort to get all the profit possible in that time. The result would be that during the closing period of the lease, if it appeared that all the ore could not be extracted, the most profitable would be taken and no attempt would be made to keep the mine in repair. At the expiration of the lease the country would be the proud possessor of a hole in the ground, probably containing a greater or less amount of what was at one time payable ore, but which, under existing conditions, would cost far more to extract than the ore would be worth; nor could this be prevented except by having a reliable and capable Government mining engineer at every mine in the country with a staff of surveyors, samplers and assayers.

If the people wish to retain their mineral resources then let the Government take over the whole business of prospecting, developing and mining.

Further more, what is the necessity of the Government retaining ownership of mineral lands? It can, at any time considered necessary for the welfare of the state, commandeer the output, or take over the operation, or even stop the production of any mineral. It seems to me that the tenure of mineral lands by leasehold instead of freehold would tend to discourage the prospector and frighten away the investor, to rapidly exhaust the high-grade ores, and to encourage wasteful methods of ore extraction.—X. Y. Z.

Nova Scotia's Mines and Minerals Production, in Relation to the War

By HARRY PIERS, Provincial Museum, Halifax, N.S.

The Mines of Nova Scotia and the various local industries affiliated therewith, took their full share in contributing to the winning of the late war; and the record on the field of honor of the thousands of sturdy enlisted men from our colliery districts has been one to be truly proud of, and while many a fine Nova Scotian lad lies beneath the poppies in Flanders, others now stand triumphant along Rhine.

Despite very adverse conditions as regards labor supply, resultant from the heavy enlistment of skilled miners, and a great shortage of shipping and to some extent of rolling-stock; the mining industry put forth noble and united efforts to thoroughly do its bit as an auxiliary factor in the great world-struggle; the result may be viewed with pride by the people of the Atlantic provinces in general, and by the mining population in particular.

The chief mineral industry of Nova Scotia is at present that connected with the extraction annually of several millions of tons of bituminous coal of remarkably good quality, from its immense coalfields which cover a large part of the province, and which in costal regions extend for unknown distances under the sea. This vast industry claims our first attention.

Coal Production.

Of late years the production of bituminous coal in Nova Scotia has been regularly increasing from about 2,000,000 tons in 1890*, 2,089,245 in 1895, 3,238,245 in 1900, 5,050,420 in 1905, and 5,477,146 in 1910, until it finally reached the highest point in its history in 1913, when an output of 7,203,913 tons was attained, with the certain prospect of a still higher production under the normal peace conditions which were then existing, and which no one then thought would be so suddenly broken. The value of Nova Scotian coal was becoming yearly better known and more fully appreciated in more distant markets, every effort was being made to take full advantage of new openings for extending the trade, and to thereby increase the profits and the welfare of the province, and the whole prospect looked very bright indeed.

In the very midst of all this prosperity, war broke out in August, 1914, the whole country was suddenly put on a pre-arranged war footing, the voluntary enlistment of men for military service began, transportation problems became increasingly more difficult, and the result was soon seen in a slight drop to an output of 7,005,464 tons of coal for the year, and a still greater decrease to 6,379,463 tons in 1915. Great efforts were made to successfully cope with the adverse conditions which had thus arisen. Even with a great decrease in skilled workmen, the output, owing to an increased production per man, actually advanced in a gratifying manner to 6,496,472 tons in 1916, which was greater than the peace-time output of 1911.

*It is to be kept in mind that the fiscal year of the Nova Scotian Government ends on 30th September, and mineral returns conform thereto.

Coal was now being urgently needed for large munition factories which had sprung up in various places late in 1915, and noble efforts were made by the operators and the miners themselves, to keep up the source of power required by these war industries which worked for twenty-four hours every day in the year. The miners were being further reduced in numbers through enlistment, and new men had to be secured, often with much difficulty, by agents in the west, and these new hands had to be broken into colliery work, and rapidly turned into capable employees. In the year 1916, the output per man at the working-face, per year, reached the very high figure o fabout 590 tons—the highest on record in the province. This production per man will stand as an evidence of what can be accomplished under stress, and will no doubt furnish a datum point as to full efficiency in the future.

Still the number of employees continued to decrease, as large numbers patriotically passed to join the colors. Others came under the Military Service Act of 1917, and still others were attracted by the higher remuneration of the munition works where they felt they were also taking part in the war activities of the country. Transportation was becoming increasingly difficult both by sea and land, the former through the destruction of shipping and the latter through the inadequate amount of rolling-stock available to handle the vast amount of war supplies, food, and men which were pouring ceaselessly toward Europe. Despite those deterring factors, the output of coal in 1917 was 5,803,660 tons, and the production per man was about 560 tons.

In 1918, the year just closed, the total production was about 5,266,000 tons, which about equals that of the pre-war year 1909. It may be observed that the production of coal is in ratio to the number of men employed; and when workmen cannot be obtained for any reason, the output falls off and this holds good relatively no matter what degree of efficiency labor has attained to.

Coal in Cape Breton is probably worth about $6.00 a ton at the mine, and in Pictou County about $6.25 to $6.40; so that the output for 1918 had a value of about thirty-two and a quarter million dollars.

Men Employed, Output per Man, and Enlistment.

The war, as has been noted, had a very bad effect numerically upon the personnel of all the collieries. When hostilities broke out and voluntary recruits were called for, no class responded more readily and in greater numbers than the hardy coal miners, who were of muscular physique, and enured to fatigue and ever-present danger, and special Highland battalions were raised in Cape Breton Island, and others were largely recruited there and among other mining communities throughout the province, the most enlistments probably taking place in 1916. Large numbers joined the well-known 85th Nova Scotia Highlanders, the famous 25th Battalion, the 185th Cape Breton Highlanders, one of the Seige Batteries and some enlisted in the 64th Battalion, as well as in other corps.

The deeds of these noble men on the field of battle

show of what magnificent stuff these hardy and courageous Nova Scotian miners are composed. In one section of the Highland battalions—the 85th—over three-fourths came from Glace Bay, Inverness, Sydney Mines and the Dominion Collieries. The great fighting done by these and other berserks of the coal-pits, has been heralded by war correspondents and brought justifiable pride in the hearts of all. The same holds true of every battalion and battery in which the Nova Scotian miners are represented; they form a large proportion of the rank and file, and are among the very best of the nation's fighting men.

The mines had been pretty well stripped of able-bodied men under voluntary-enlistment system, and when the compulsory Military Service Act of 1917 came into force, a still further drain was made upon the mines. Agents of the coal companies had to sent afield in an effort to secure labor. As the production of coal is a very vital factor in prosecuting a successful war in modern times, particularly when munition works are dependant upon coal to turn their wheels, when maritime carriers and war vessels consume immense quantities of fuel, and the people of the country have to be kept warm in winter; the serious nature of this drain upon the personnel of a very essential industry was brought to the notice of the authorities, and it was felt that some remedy should be forthcoming.

The new munition works, as we have seen, were also offering large wages which attracted many men from the collieries to the workshops, and this was an extra menace to the coal industry, although the mechanics were still employed in urgent war-work. The opening of several small new collieries in various sections of the province, while it helped somewhat to lessen the acuteness of the transportation problem, by supplying near-by markets, lowered the available number of colliers for the older mines.

Some particulars will now be given of the number of men, above and below ground, employed at our collieries, and of the output per year per man at the working-face, as this data has, of course, a direct bearing upon the production. The reasons for the decrease in the personnel has been just referred to, and was a direct consequence of war conditions.

Men Employed in Nova Scotia Collieries.

In 1913, the year of our greatest coal production, 13,664 persons were employed above and below ground in the various Nova Scotian collieries, and the output per man "at the face" per annum was about 530 tons; the latter being the highest man's output hitherto, although the year 1902 nearly equalled it. The average output per man had been about 489 tons for the sixteen years since 1898, in which latter year the man output had suddenly gone markedly upward by about 123 tons from the average of 366 tons, which existed for the decade between 1888 and 1897. In one year, 1893, it had even dropped slightly below the 300-ton mark.

In 1914, the year of the war's outbreak, the number of persons employed had risen to 14,638; but the output per man dropped by 40 tons to about 490 tons. In 1915 the number of employees had further increased to 16,326 which was the largest number ever employed in the history of our coal mines, as the effects of enlistment were not then marked, and new men could be obtained to replace those who had joined the colours; but the output per man remained at about 490, as in the previous year, probably owing to the introduction of new men to take the place of skilled hands who had gone overseas.

In 1916, owing to increased enlistments in the military forces, etc., the number of employees suddenly dropped to 13,124, this being a decrease of no less than 3,202 men, which placed the working force back to where it was in the pre-war year, 1912. This was a very serious handicap to an essential industry which was striving hard to do its part in the economic phase of the war. The situation so created was, however, manfully met by increasing the efficiency of all the departments, and we are surprised and much gratified by seeing the output per man "at the face" per year suddenly leap upwards, by one hundred tons, to the splendid figure of about 590 tons which represents the very highest state of efficiency our colliers have ever attained to. This is a record to which our miners may very well point with pride. Thereby the total output of coal, even with a decrease of considerably over three thousand employees, was increased over that of the previous year by 117,009 tons. There were then about fourteen companies operating, which had been the average number during the preceding seevral years.

In 1917 the number of men employed still further decreased to 12,483 and the output per man was about 560 tons. Several new collieries, of small size and each employing about ten men, had opened this year, particularly in Cumberland County, and the number of operating companies had thus increased to twenty-one; so that the decreased total number of employees showed a still heavier decrease of labour at each of the older collieries. Some men left the old deep mines, preferring to work in the shallow new ones, where they would have shorter distances to go underground to their work, and where the conditions were considered safer. To counteract the shortage of labour, patent mechanical loaders were introduced that year into some of the collieries of the Dominion Coal Company, and this was found to affect a saving of about one man to a room.

It may be said to the credit of the workmen, that labor agitations were pretty generally put in the background during the war, and all united as far as possible in speeding-up the general output and efficiency.

Distribution of Coal.

During the war the St. Lawrence trade was necessarily discontinued. The following tabulation shows that the shipments to Quebec have been very small, as compared with normal years. The distribution of Nova Scotia coal by Provinces for the fiscal years ending 30th September, was as follows:

	1913.	1917.	1918. approx.
Nova Scotia	2,599,053	2,880,787	2,758,970
Quebec	2,193,228	303,012	134,440
New Brunswick. . . .	646,642	888,162	882,600
United States.	468,091	342,100	296,000
Bunkers.	234,177	382,973	285,360
Newfoundland	210,544	236,530	219,190
P. E. Island	96,082	103,168	78,070
Ste. Pierre	6,650	6,043	5,400
Other countries	2,830	299	. . . . .
Total	6,457,297	5,143,074	4,660,030

The springing into being of large thoroughly-equipped munition factories in Nova Scotia, working at top-notch pressure, day and night, and calling imperatively for power with which to drive their machinery, created a new and sudden demand upon the resources of our collieries which had to be promptly met. These collieries, besides producing a source of power for railway locomotion and various industries as heretofore, as

well as fuel for warming the people and for other household uses as in normal times, immediately came in with a direct contribution to the forces which were behind the guns. More coal, and still more coal, was required for smelting purposes and for the production of unusual quantities of steel, and finally for manufacturing this material into shells of all calibres and other warlike supplies which were rushed to the European front in large and continuous shipments.

We have some indication of this new, warlike use of our coal on glancing at the total coal consumption in Nova Scotia during recent years, having in mind that the average local consumption for a few years prior to the war was about 2,179,510 tons. The excess might at first sight be roughly put down as the amount used in the production of munitions, although actually the quantity used for the latter purpose was very considerably in excess of that, as the manufacture of structural steel, rails and ordinary commercial iron and steel was much cut down during the period of war, so that more of our coal was used in munition work than a direct comparison of the figures might otherwise suggest.

It is worthy of notice, that the high price of anthracite coal and the difficulty of obtaining it, caused many people in our towns to use bituminous coal in their heating furnaces; and once having tried this with success, without doubt many will continue the use of this fuel in the future, as being satisfactory and much less costly than anthracite.

Another direct contribution towards the war made by our coal mines, was the large amount of bunker coal disposed to many transports, munitions steamers, food-carrying vessels and ships of the navy. These vessels were bunkered at Louisbourg, Sydney and Halifax. The exact amount of such coal is not known, as much bunkering was done by private firms who had purchased from our collieries and it does not appear in our returns as separate from the local consumption.

The General Conditions at the Collieries for the various years may finally be thus set forth:—

In 1914 the working conditions at all the collieries were good; development work had been kept well in advance; power installations had been maintained at their usual high efficiency; and generally the collieries were developed and equipped for an output largely in excess of any that had hitherto been reached.

In 1915 the shortage of men and difficulty in obtaining sufficient means of water transportation, both caused by the war, had had the effect of decreasing seriously the output of coal; but the collieries in respect to equipment, working conditions, and development toward a much greater production, were in as satisfactory a condition as at the close of the previous year.

In 1916 although the shortage of men and the means for water transportation continued throughout the year, the output and sales were greater than in the preceding year, and it is to be particularly noted that the consumption of coal within the province increased by 710,869 tons as compared with that of 1915, this being largely due to the establishment of munition works and the consumption of coal therein.

In the next year, 1917, the lack of men and of adequate transportation were acutely felt. Compared with the previous year the output decreased by 692,811 tons and the sales by 790,636. This decrease in sales was about balanced by the reduced shipments to Quebec and the United States. The quantity of coal, however, sold in Nova Scotia was 2,880,787 tons, or a gratifying increase of 54,487 tons over the preceding year which itself had been a most noteworthy one in this respect.

In the year just closed, 1918, the operators were still confronted with the labor supply and transportation problems, and the total production fell, by about 537,660 tons, to approximately 5,266,000 tons, while in Nova Scotia the consumption decreased to about 2,758,970 tons, being a little more than half the entire output.

Iron and Steel Industry.

In the progress of the iron and steel industries of the province we observe further evidence of what was being done to help in the war-time activities of the country. As the war preceded, trade fell off considerably in the ordinary peace-time iron and steel products, owing to the temporary suspension of curtailment of much constructional work which was not very necessary; but the establishment late in 1915 and in 1916 of munition plants, operating at fever speed, day and night, called for coal, metallurgical coke, and limestone for flux, as well as the essential iron ore, pig-iron, and steel of special grades. We have seen how the local consumption of coal was strongly affected by this, particularly from 1916 onward. The following table shows clearly the effect of this, concurrently, upon the iron and steel industry of Nova Scotia, and how that province exerted itself to supply the demand for the local munition works, despite the hampering shortage of labor and transportation. The item of steel ingots shows the general trend. In 1913, the production was 483,600 tons, which decreased to 341,818 in 1914, but recovered to 369,310 in 1915 despite the decreased trade in ordinary commercial products, and a marked improvement is noticeable in 1916. Thence it mounted rapidly to 515,538 tons in 1917 under the stimulus of shell production, which is the high mark in the industry. A very large proportion of the iron and steel output after 1915 represents projectiles furnished the British guns to carry on the terrific daily bombardment at the front, and it was the ultimate preponderance of gun-fire which was such a very vital factor in the winning of the great war. The production of iron and steel in this province centres at the Dominion Iron and Steel Company's blast furnaces and steel works at Sydney, and those of the Nova Scotia Steel and Coal Company at Sydney Mines and Trenton.

The detail figures representing the iron and steel production are as follows, those for 1918 being approximate ones, as the exact amounts have not yet been made public:—

	Iron Ore, imported, Long Tons.	Pig Iron produced Short Tons.	Steel Ingots Short Tons.	Coke Short Tons.	Limestone, Short Tons.
1913	991,168	486,962	483,600	728,037	547,004
1914	562,103	281,428	341,818	467,730	335,515
1915	665,541	295,868	369,310	452,099	353,412
1916	795,066	429,615	502,106	669,478	514,474
1917	991,084	437,354	515,538	645,327	411,575
1918*	637,000	380,700	470,900	584,900	407,000

Munition Works.

The large, well-equipped shell factories to which reference has so often been made in this article, were first established here, under governmental inspection, early in summer of 1915, and were located at Trenton, Amherst, New Glasgow and Sydney, while others were at Dartmouth, Yarmouth, etc. By June, 1915, ninety per cent of the Nova Scotia Steel and Coal Co.'s open-

* Approximate.

hearth steel furnaces was being used in the production of shells. Among the important companies thus engaged in the production of such munitions, may be mentioned:—

The Nova Scotia Steel and Coal Company, Ltd., Trenton;

The International Engineering Works, Ltd., Amherst;

The Dominion Iron & Steel Works, Ltd., Sydney;

J. W. Cumming and Son, Ltd., New Glasgow;

The Starr Manufacturing Co., Ltd., Dartmouth;

The Burrill-Johnson Iron Co., Ltd., Yarmouth.

The supply of steel was obtained from the Dominion Iron and Steel Co., and the Nova Scotia Steel and Coal Co. Equipped with all necessary forging apparatus, presses, lathes, etc., and a large staff of men who soon became thoroughly proficient in the precision work requisite in this branch of mechanical engineering, the operating companies worked continually for twenty-four hours each day in the week, and produced vast quantities of shell-blanks, disks and other accessories, and assembled and finished them as forged-steel shrapnel and high-explosive (common lyddite) shells for the use of the British Army as well as for the Navy. These were inspected by government officials, boxed and shipped, and only required the addition of the bursting-charge to be ready to go to the guns. The shrapnel was also charged here with the requisite weight lead-alloy bullets.

Among the classes of forged steel projectiles turned out by the Nova Scotian munition workers were:

12 and 14-pounder (3-inch) shrapnel shells for quick-fire guns used by the British Navy in auxillary batteries for defense against torpedo-boat attack.

18-pounder (3.3-inch) shrapnel and also common lyddite (high explosive) shells for quick-fire guns of the light batteries of the British Field Artillery.

4.5-inch common lyddite (high explosive) shells for quick-fire field howitzers of the howitzer batteries of the British Field Artillery.

60-pounder (5-inch) common lyddite (high explosive) shells for breech-loading guns of the heavy batteries of the British Field Artillery.

9.2 inch common lyddite (high explosive) shells for siege howitzers of the British Siege Batteries.

Some firms, such as the Brandam-Henderson, Ltd., of Halifax, took up the work of casting shrapnel bullets from lead-antimony alloy, and prosecuted their work both night and day, their product after inspection being barrelled and shipped to the shell factories.

It is impossible at the present time to give figures to show to just what magnitude all this war-time industry attained, as the secrecy which surrounded all such works at the time has caused quantitative returns to be, as yet, kept in the background. It was, however, an industry of great proportions, and the output was a direct contribution to the cause for which the Allies were fighting.

It is satisfactory to note that about April, 1918, arrangements were made with the Dominion Iron and Steel Corporation, under which that company will erect a plant at the cost of three to five million dollars for the construction of ship's plates, and will be in a position to turn out 150,000 tons of ship steel annually, beginning in July or August, 1919. This will have a very important bearing upon the programme of Dominion-wide shipbuilding which is now being carried out to replace losses caused by the war.

Railways:—In 1915 the Eastern Car Company, New Glasgow, N.S., constructed many cars for the Russian government as well as for France. In filling these orders, our iron-workers were required to produce large numbers of axles, wheels, and other metal fittings.

Toluene.

The urgent demand for a continuous and ample supply of material for the production of modern high-explosives for military purposes, and the knowledge that great quantities of coal-tar could be readily produced in Nova Scotia, soon led to the distillation at Sydney of large amounts of toluene, toluol, or methylbenzine, a liquid chemical product akin to benzine, and obtained from coal-tar by rectification of the fractional boiling between 100 and 120 degrees. It derived its name from having been first obtained by the dry distillation of tolu-balsam; whereas now the most abundant source is coal-tar, from which it is derived by a process of fractional distillation. The toluene produced in Nova Scotia was subsequently nitrated at Quebec, and thereupon became the crystalline substance, with excessively violent explosive properties, when properly detonated, to which the now well-known name trinitrotoluene (TNT) has been applied, a high-explosive which has proved a large factor in the war, both on land and sea. It was 204,000 kilograms of this explosive from the United States, with 2,114,000 kilograms of picric acid and 56,000 kilograms of gun-cotton which destroyed part of Halifax when the steamship "Mont Blanc" blew up on December 6th, 1917.

Little has been known about the production of toluene in Nova Scotia, as the usual secrecy surrounded all that related to it as in the case of other munitions. The first issue of it here was in April, 1915, and from then until the end of November, 1918, over 705,000 gallons were produced. After the war, a proportion of the toluene output might possibly be utilized in dye production.

Stibnite.

Some activity was shown in the production of stibnite from the well-known mine at West Gore, Hants Cp., N.S. This mine was re-opened in 1915 and in that year 10,872 long tons of ore was raised, which increased to 14,149 tons in 1916, and dropped to 10,660 tons in 1917, in the summer of which year the mine ceased operations owing, it is reported, to a pinching of the deposit. This mineral is a valuable ore of antimony, and also here carries gold values, and it is largely utilized in preparing the lead-antimony alloy from which shrapnel bullets are cast.

Scheelite.

The scheelite mine at Sheelite, Halifax Co., N.S., was closed subsequent to 1913, after a certain amount of tungsten ore had been extracted. It was re-opened in 1917 and some 50½ long tons of scheelite were raised, but the mine was subsequently again closed.

Manganese.

Nova Scotia has the well-known reputation of having produced some of the highest grade manganese ore that has been on the market in the past. No returns, however, were made in 1915, but in 1916 there were produced 544 long tons of ore, while in the next year, 1917, the returns gave 180 tons. In 1918 some ore was produced at Loch Lomond, C.B., by C. V. Wetmore of Sydney, and the Rossville Manganese Co., operating near New Ross, Lun. Co., had a shaft and were engaged in exploratory work, but unfortunately had their headgear destroyed by fire.

Molybdenum.

A little molybdenum ore was produced in 1917 near

New Ross, Lun. Co., from a property recently opened at New Russell, but it has not yet had time to be sufficiently developed to become an extensive producer, although such work is in progress. Some of the development work in the mineral deposit referred to above, was carried out under superintendence of the Munitions Commission.

Gold.

The gold production has fallen off, one of the causes being the dry seasons which interfered with the operations of the hydro-electric plants as in 1916, and another being that mines which had been operated at a profit in normal years have been unable to do so in wartime in consequence of the great scarcity and advance in cost of labor resulting from the drafting of men into the army and the high pay offered by munition and other works, as well as the greatly advanced price of materials.

The gold production of the province during the period of the war has been but a few thousand ounces. The total gold production of Nova Scotia from 1862 to 1917, was 956,497 ounces from 2,187,493 tons of ore crushed, which shows the high average yield of 2.28 ounces per ton.

Gypsum.

There are inexhaustible deposits of good gypsum on tidewater in Nova Scotia, and the trade in it is a large and rapidly growing one. The output of recent years has been,—in 1914, 283,340 short tons; in 1915, 230,216 tons; in 1916, 279,400 tons; and in 1917, 298,108 tons and 10,000 tons of calcined plaster.

Barytes.

Excellent barytes for use in paint manufacture occurs at Lake Ainslie, C.B., and 1,400 tons were mined in 1914, 750 tons in 1915, 1,262 tons in 1916, and 2,400 tons in 1917. Deposits are also located in various other parts of the province.

Moulding Sand.

Moulding sand has been produced to some extent for use in foundries, the amounts being 430 tons in 1914, 800 tons in 1915, 500 tons in 1916, and 250 in 1917.

Other Produce of Nova Scotia mines and quarries are tabulated below and in some instances amount to large quantities. The feestones of the province are well-known for their excellent quality and pleasing variety of tints.

	1914.	1915.	1916.	1917.
Building stone, short tons	15,468	39,654	32,399	24,711
Cement blocks, number	.....	.....	15,000	25,000
Bricks, number	14,543,608	1,922,100	19,504,987	13,598,075
Drain-pipes & tile, feet	1,592,875	1,022,470	959,933	1,355,297
Sewer blocks, feet	....	....	76,470	....
Grindstone, tons	202	235	260	360
Coal briquettes, short tons	24,170	13,890	635	....
Ammonium sulphate, long tons	4,139	4,303	5,121	5,068

Salt.

In the autumn of 1918 a bed of salt was discovered near Malagash, N.S., and is now being prospected with a shaft and bore-holes. Fishery salt was greatly in demand at one period of the war, and the discovery of a workable deposit in this province would be a great benefit.

Prospecting.

There has been a considerable revival of prospecting for minerals which had gained an increased demand and a higher value during the war; and numerous enquiries were made by firms looking for workable deposits of various minerals and ores which had come into prominence through the shutting-off of the supplies which had formerly come from Germany.

To assist prospectors and those developing known mineral deposits, the government of Nova Scotia possesses core-drills of various sizes and kinds, which may readily be obtained on paying running expenses and for wear to the cutting material. These drills have done a large amount of excellent exploratory work in past years, and have saved much labor and money which would otherwise have been expended in sinking trial shafts. They have also contributed, through their published logs, to our knowledge of the geology of the province.

MINISTER OF MINES OF BRITISH COLUMBIA VISITS OTTAWA IN INTERESTS OF MINING INDUSTRY.

While in Ottawa, Hon. Wm. Sloan, Minister of Mines, will take up with the Dominion Government a number of matters of first importance to the advancement of the mining industry of this Province, one of which will be the matter of effecting an arrangement to throw open Indian Reserves of this Province to miners. As far as the Province is concerned, its policy already has ben defined by certain amendments to the "Placer Mining Act," and the "Mineral Act," and it remains for the Dominion to declare itself in agreement with the principle thus laid down for the areas to be thrown open to development by the Lieut.-Governor's proclamation.

Another matter which the Minister will discuss is the advisability of placing under Provincial control the minerals within what is known as the Railway Belt in this Province. Under the terms whereby the Canadian Pacific Railway was built through British Columbia to the Pacific Coast the base metals for forty miles on either side of the railroad were handed over to the Dominion Government. Mr. Sloan has a proposal to make to the Ottawa Government, having in view the assumption by the Province of this authority to the end that a policy of developing the minerals within the area, particularly the coal and iron, may be proceeded with. He maintains that the dual system of mineral administration from the Coast to the Rocky Mountains along the line of the C. P. R. has had and continues to have the effect of retarding the progress of the mining industry and thinks it would be beneficial to the Western country to have the minerals within this forty mile strip solely under the Provincial Department of Mines. His position in this respect is exactly the same as it is with regard to the E. & N. Railway Belt on Vancouver Island, which has been referred to heretofore.

There are other questions, however, to be laid before Ottawa which also are of the utmost moment. One is that the Federal Administration should give practical evidence of its interest in the development of the iron ore resources of Western Canada by supplementing the British Columbia Bounty on the manufacture of pig iron from locally produced ore. He would have the Dominion offer such an additional bounty as would make the initiation of the industry in the Pacific Northwest irresistibly attractive to capital.

The Federal Government will be asked, also, to grant financial aid for the establishment in British Columbia of an experimental station for comprehensive mineral research, which would include flotation processes, treatment of complex and refractory ores, utilization of coal by-products and other chmical determinations.

Mr. Sloan estimates that an adequate experimental station would cost between $150,000 and $200,000, and states that the logical site for it would be at Point Grey, Vancouver, in connection with the British Columbia University, on the buildings of which the Provincial Government will spend this year some $500,000. He thinks, therefore, that it is the proper time to make an effort to secure such a University adjunct, asserting that it would very materially and most profitably enlarge the scope of the present mining school. "In this Province," he says, "the miners are confronted with many difficulties in the treatment of complex ores. With an Experimental Station, equipped for scientific research and skilled laboratory work, many of their problems would be solved, and they would be enabled to obtain much fuller returns on the various minerals found in our ores."

Mr. Sloan also proposes to bring before Ottawa the question of the Dominion Government making a grant to aid the Province in carrying out its policy of assisting miners in the construction of roads and trails to promising prospects and mines.

Finally the Minister will talk over with Hon. Mr. Burrell, Minister of Mines, the plans of the Dominion with respect to geological survey work in the West this summer. He is very appreciative of what has and is being done by the central government along this line, and hopes that the activity of the past will be continued.

BRITISH COLUMBIA COAL AND COKE PRODUCTION.

Statement of Coal and Coke Tonnage Returns for the Month of February, 1919.

	Tonnage. Coal	Tonnage. Coke
Canadian Collieries, Ltd., Comox	50,691	1,938
Canadian Collieries, Ltd., Extension-Wellington	19,535	Nil
Canadian Collieries, Ltd., South Wellington	5,566	Nil
Western Fuel Co., Nanaimo	59,105	Nil
Pacific Coast Coal Mines, Ltd., South Wellington	4,719	Nil
British Columbia Coal Mining Co. (Leased), East Wellington	2,748	Nil
Nanoose Collieries, Ltd., Nanoose Bay	500	Nil
Crows Nest Pass Coal Co., Michel	14,195	4,970
Crows Nest Pass Coal Co., Coal Creek	21,684	3,805
Corbin Coal & Coke Co., Corbin	3,172	Nil
Middlesboro Collieries, Middlesboro	3,935	Nil
Princeton Coal & Land Co., Princeton	2,051	Nil
Fleming Coal Company, Merritt	3,729	Nil
Granby Company, Cassidy's Landing	3,891	Nil
Coalmont Collieries, Coalmont	800	Nil
Telkwa Collieries, Telkwa	236	Nil
Total tonnage	195,557	10,713

THE NIPISSING REPORT.

In his report for the year 1918 President E. P. Earle, of The Nipissing Mines Co., says:

"It is a pleasure to again report to stockholders the results of a very succesful year's operation of The Nipissing Mining Company, Limited. Conditions have been most unusual. Materials of all kinds used in our mining operations advanced greatly. The wages of our employees have been materially increased, and an unusually large sum had to be set aside for war taxes. Fortunately the rise in the price of silver offset the large increase in the cost of operation, with the result that the net profit was as much as in the previous year. The production of the mine was 3,701,416 fine ounces which was sold at an average price of 99.14 cents per ounce at Cobalt. The net operating receipts were almost $2,600,000. Dividends paid were $1,800,000, which brings the total sum distributed to the stockholders up to $19,140,000. As has been previously stated, stockholders should bear in mind that the large dividends paid by the company should be considered as in part a return of capital. The surplus has increased from $2,731,000 to 3,441,000. Development of new ore did not fully make up for the large production, so there is some decrease in ore reserves, which now stand at about 6,000,000 ounces. The mines and mills are fully equipped to handle our production in a most economical way. It is especially gratifying to your directors to be able to state that the properties of the company have been operated at full capacity throughout the war, without any trouble with its employees."

Kirkland Lake's New Mill.

Milling operations were commenced on a large scale at the Kirkland Lake Gold property, in the Kirkland Lake camp recently. Certain portions of the milling equipment have already been tried out and found to give highly satisfactory results. The workings of the mine have been carried to a depth of 700 feet, and the orebody showed every indication at this point of continuing to still greater depths. This is the deepest working in the Kirkland Lake camp to date. A large quantity of milling ore is on the surface dumps ready for treatment in the new mill, and the new central shaft is being connected up with the various workings of the mine to the 700-foot level, which will greatly facilitate the handling of the ore in the future. The Kirkland Lake Gold Mines is owned by the Beaver Consolidated Silver Mines of Cobalt, and has been brought to its present state of development by the latter company. The mill is conceded to be one of the most modern in the north country.

Mr. M. J. Carrigan, of Seattle, certainly deserves that new addition to his name "Pig-Iron" Carrigan. He earned it.

Eli Carpenter, Discoverer of the Slocan

By J. C. GWILLIM.

Eli Carpenter, who discovered the Slocan, B. C., silver-lead camp in 1891, died near Salmon Arm, B. C., in January, 1917. Many old-timers of the Kootenay country will be interested to have some account of him since he left that district in 1898 to find his way, by the Edmonton route, to the Klondyke.

He was then about 60 years of age and some of us did not expect to hear of him again. Rumors came that he was trapping on the Athabasca; and then that he was dead. Two years later he turned up in Dawson.

By chance I met a Mr. C. H. Ivens, of Salmon Arm this winter. He said he had helped carry Eli Carpenter to his grave, and this inclined me to make some enquiries of his later history, so that there might be some record of a brave old man whose life, as one of his friends, a pioneer of Slocan, says brings to my mind the words of the poet: "Many towns claim Great Homer dead, through which the living Homer begged his bread."

No one seems to know where Eli Carpenter was born. He was a French Canadian, small, dark and wiry, rather reticent and modest about himself. According to his own allusions, he ran away from his home in Quebec, and was, in his youth, an acrobat and tight-rope walker, during which period he crossed various canyons on a rope. Bruce White, who died at Nelson last winter, and was companion to Eli on some of his trips in early Slocan days "always contended that Eli was the original Blondin who walked across Niagara Falls on a tight rope, but (says Mr. Neil MBething), I do not know what led Bruce to believe this." Certain, it is that one Dominion Day about 1897 he crossed the main street of Slocan city on a rope thirty feet from the ground repeatedly and threw in a few fancy tricks while up there. He was about 60 years old and hard up then, and an honorarium of $50 was oclleeted on the spot.

In 1890 southern Kootenay was the mecca of western prospectors. The Hall Mines "Silver King," had been found by Colville half-breeds, and Rossland Red Mountain by Bourgeois and Moriss. Colville Joe" and Indians told of rich mineral deposits in the Slocan Lake district. So Neil Gething and Bill Springer crossed the mountain ranges from Kootenay Lake to the head of Lemon Creek and thence down Springer Creek to Slocan Lake in 1890. They were probably the first prospectors who reached Slocan. Some of their assay samples carried good values; but on their return to Nelson, Joe Moriss and Joe Bourgeois turned up from Trail Creek with news of the Rossland discovery, and this diverted attention away from Slocan until the next year, 1891.

Prospectors were now working up the creeks on the western side of Kootenay Lake, and amongst them was Eli Carpenter who is said to have been "grubstaked," by Scott McDonald of Hot Springs (Ainsworth). Eli made his way up Kalso Creek for some twenty odd miles through thick brush and down logs following the valley to the divide and over to Carpenter Creek, which flows the other way, into Slocan Lake. Getting short of grub he decided to return to Kootenay Lake by way of the mountain ridges so climbed up Payne Mountain, which rises above the three forks of Carpenter Creek and has a grand view down the creek to Slocan Lake, and the glaciers on the other side of it. Here he found float galena, and after some search, the outcrop of the Payne Mine near the summit of the ridge. His location was made. The ore, assayed at Ainsworth, ran over two hundred ounces of silver to the ton. Mr. Angus McInnes, mining recorder of New Denver has made an "abstract" of the original record, it is:

Mineral claim—Payne.
Located by—Eli Carpenter 34566, John Seyton 39686.
Situate—About twenty-five miles west of Kootenay Lake in the head waters of Slocan Creek.
Direction of centre line—North-east and south-west.
Length—1,500 feet.
Located on 9th day of September, 1891.
Recorded this 22nd day of September, 1891.
Recorder—T. H. Griffin.

Eli Carpenter's discovery caused a stampede, and there was a wild scramble to get locations before snow fell. He seems to have returned himself, for that same fall. Mr. Neil Gething says; Bruce White and Eli were returning by way of Slocan river, when some one's dog robbed their outfit. Coming across an old trapper's cabin they found an ancient wild swan suspended. " Bruce was afraid to eat it on account of it being so old, and also of the possibility that it might be poisoned for bait, but Eli, who was very hungry, could not agree with Bruce, and said, 'Bruce, if we have got to die, we might as well died with our belly full.' "

In that same fall or winter Eli Carpenter sold the Payne prospect to Eteve Bailey for five hundred dollars (at a later period this mine paid over a million in dividends). Bailey opened up the mine in the following summer. Quoting Mr. Gething: "Eli was a mildly disposed man and bore but little animosity to anyone, but I remember one incident in which he seemed to be completely upset. It was late in the fall and prospecting was all over, and of course Eli's money was all gone by this time, so he rolled up his blankets and packed them on his back started up the hill, from the hotel, to where he was sure of a job from his friend Bailey, in the mine he had sold for five hundred dollars. When he arrived at the mine he found everything going fine, but was informed: full handed.' So old Elie had to take up his bed again and look for a job in another place."

In 1895 prospecting shifted to the "dry ore" district at the southern end of Slocan Lake. Eli cruised round these hills for awhile without finding much. He was an occasional contributor to our assay office in Slocan City, and on one occasion said he would like me to teach him how to assay, but he never turned up for instruction. He referred to experiences in Colorado, and I think must have come from there to the Kootenay. It was during this period that he astonished us with the tight rope performance.

In 1898, like thousands of others, Eli started for Klondike; but he chose a bad route. He left Edmonton with others, and after two years wandering arrived alone in Dawson, "nearly starving and almost

naked." Some accounts say that he and his companions went by way of the Peace and Mackenzie rivers, thence up the Laird and across the portage to the Pelly, a branch of the Yukon. At any rate he finished alone, and is said to have considered this "breaking trail from Edmonton to Alaska as his greatest achievement." His old associates used to say that "given matches and a small sack of salt he could stay in the mountains for months, for he could make meals out of everything in sight."

Before leaving on this trip he gave to Wm. Thomlinson of New Denver, who first met him in 1892—"the carbine which he carried on all his explorations for many years previously; and he also gave me the historic pole pick with which he broke the first float found from the Payne mine, the first mineral claim to be recorded in this camp. I still have these mementos of that brave little pioneer."

Arrived in Klondyke, he is said to have got some hydraulic ground which he worked out in one year by putting on a night shift but made little out of it account of the large amount of waste. Others say he made some money, and he is credited with having made two fair fortunes in his time which were easily squandered on the less fortunate.

About 1911 he reappeared on the prairie east of Calgary, and gathered some stock together; but was found to be squatting on a school section, from which he had to move. At this time he was thrown from his cayuse and broke his leg. After a period in a Calgary hospital he decided to go prospecting again in British Columbia and took a ticket for Kamloops. On his way to the train he slipped and broke the newly set bone, but in spite of that boarded the train and arrived at Kamloops where he went to hospital again. He was now about 75 years old.

Here he fell in with a man from Celesta, near Salmon Arm, and went there with him. Quoting Mrs. Jackson of Sicamons, who came to know him well, "This plan was carried out but did not work well. E. C. found his money getting less and apparently 'nothing doing.' So, although the lake (Shusways Lake) was frozen, our friend decided to pull out for Sicamons. He left Celesta early one morning on a small handsleigh, with a couple of blankets. As he was obliged to use crutches in moving about, he fixed a bent nail in the end of each, and, sitting on the sleigh propelled himself along. He made 24 miles that day, and when dusk came he made camp in Hungary Cove, a few miles north of Murdoch Point, which is opposite Sicamons. Next morning he found that had he proceeded, it would have proved disastrous, for a little further on the lake had opened up."

From Sicamons he made his way to Australia, and stayed in that country two weeks. He is said to have found gold there, but no water to wash it. In 1913 he returned to Shuswap Lake.

"He seems to have been attracted by Shuswap Lake and neighborhood, so arranged to take up a homestead, where, as he put it, he could make a place to die in. He seems, at this time to have felt that his luck had given out and he did not want to go to the Old Man's Home (at Kamloops), though for years he seems to have been a regular subscriber."

His homestead at Anesly Arm was well timbered; he made his improvements, put in a flume, waterwheel and rough saw-mill; made and graded a wide road for three-quarters of a mile and cut 50,000 feet of lumber. This mill had in its framing 30 foot tie timbers and was erected by Eli entirely without assistance. "When one recalls that, at this time he was nearly 80 years old, his extraordinary will-power is better understood." Another mill which was to have taken his logs, all ready for booming, shut down, and he had to face the winter with little money and great disappointment.

A young man, Albert Brock, lived near by. "Many's the time," to quote our friend, "did this young man Albert Brock give him half his fish," otherwise the old man would have gone hungry."

"It was at this time," Mrs. Jackson says, "that we were able to fill quite a blank in helping him out." . . . . In 1916 his hand became badly mangled between the belt and the wheel of the mill, forcing him to seek medical advice; so he came to Sicamons and on to Salmon Arm. Here the local constable found him the position of night watchman at McConnel's closed mill so that he felt independent while having his hand attended to."

Mrs. Jackson continues, "All through that winter he was a regular visitor in our home, being just over the lake from Annis. The week prior to his death he spent here, preparing things for his return to his own mill, so soon as the lake opened up. He left us on Friday, we visited him on the following Sunday, sat with him and left him full of hope and good spirits. He was like a boy in his enthusiasm to get back to his mill again.

"On Wednesday, January 23rd, he was found dead in his bunk, with his head on his arm, apparently just dozed off. So, as he seemed to have no one but ourselves, we took him to Salmon Arm, where Mr. West, the Church of England clergyman, buried him on January 26th, 1917."

Mrs. Jackson adds, "He was so shy with strangers and had so little vanity, that I should doubt if a portrait o fhim is to be had. I wish there was some way of getting together enough money to put a stone over him; just to let people know that that brave spirit is in some way connected with it. Do you suppose it would be any use appealing to the readers of The Canadian Mining Journal?"

If any old acquaintance who reads this account cares to perpetuate his memory and the early days of Kootenay, the writer, or the "Canadian Mining Journal" will accept subscriptions for a simple monument.

TO MAKE ENGINEERING A CLOSE CORPORATION.

Mr. Walter J. Francis, Mr. Surveyor and Mr. Brown of Montreal, were entertained to dinner at the Engineer's Club, by the Toronto branch of the Engineering Institute of Canada. They afterwards addressed a well attended meeting on the affairs of the institute. The meeting was presided over by Mr. A. H. Harkness, M.E.I.C. Mr. Francis spoke on the activities of the Engineering Institute. Mr. Surveyor spoke on the question of securing legislation to make the engineering profession a closed corporation, similar to doctors, lawyers, surveyors, dentists and others. Mr. Brown advocated one great national institution of engineers for Canada, and that engineers should loyally support the same.

The University of Washington was well represented with Dean Roberts and his sister, Professor Landes and Professor J. H. Daniels.

Special Correspondence

Will Test B. C. Iron Ores.

Action has been taken to commence at the earliest possible moment proposed experiments with a view to determining the practicability of producing from British Columbia iron ores, and within the Province, pig iron of such quality and at such a cost as to permit it to take its place successfully in a competitive market.

Authority was given Hon. Wm. Sloan, Minister of Mines, to take the necessary iron ore practically from wherever it may be found by the terms of an Act passed at the recent session of the Provincial Legislature and entitled the "Iron-ore Supply Act." Mr. Sloan since has left for Eastern Canada but, prior to his departure, instructions were given Mr. Wm. M. Brewer, District Mining Engineer, to take the necessary steps to obtain quantities of iron ore for shipment to those plants which have asked for it. Two smelters, situated near Vancouver, B.C., have undertaken to make the changes required for the treatment of the magnetite ores and it is thought likely that there will be others ready before long to undertake the production on a smal scale of pig iron should the experiments decided upon prove satisfactory. Naturally, however, the firms which have sought the Government's assistance will be first taken care of in the distribution of ore.

The terms of the Act, which are sweeping and are generally approved in the Province, permit the Department of Mines to expend up to $50,000 in this work. The key clause of the legislation reads as follows:

"Where, in the opinion of the Minister of Mines, it is necessary or expedient to procure a supply of iron ore for treatment for experimental purposes in aid of the development of the iron and steel industry in the Province, he may, by himself, or by any person authorized by him, enter upon, take possession of, and occupy for such time as he may see fit any mining property in the province and mine and take therefrom any iron ore from thereon or thereunder; and may cause the mining and the removal of the iron to be carried out, and the ore to be supplied and delivered free to any smelting plant in the province for treatment therein for the purpose of experiment in the production from crude ore of pig-iron of a merchantable quality."

Other provisions are that no unnecessary damage shall be done or caused to any mining property so entered upon and that compensation shall be paid to the owners "computed at the maximum rate of 25 cents per ton of ore removed, or at such lesser rate as may be agreed upon. The usual tax on iron ore shall not apply in respect of iron ore so mined and removed.

Would Prevent Dumping of Metals.

At a recent meeting of the Trail (B. C.) Reconstruction Board objection was taken to the marketing in Canada of foreign metals and representations were made to the Dominion Government as indicated by the terms of the appended resolution:

"Whereas the whole interior of the Province of British Columbia is largely dependent upon the mining and smelting industry and these industries are most seriously affected at the present time owing to the demand for copper and lead being almost negligible; and

"Whereas such markets as may exist are flooded with metals dumped into Canada from other countries; and

"Whereas tremendous stocks of these metals exist in Canada at the present time and, if relief is not quickly forthcoming, the entire industry will collapse and throw approximately 15,000 men out of employment; therefore be it

"Resolved by the Trail (B. C.) Reconstruction Board on this 24th day of March, 1919, that the importation of these metals into Canada be allowed only by special permit of the Dominion Government until the stocks of metals now on hand are disposed of and money tied up in these stocks is released to carry on the industry again."

To Explore Coal and Oil Fields of B. C.

"The Coal and Petroleum Appropriation Act, 1919," is the title of a measure introduced by Hon. T. D. Patullo, Minister of Lands for British Columbia, during the last session of the Legislature and which has become law. It provides authority for the expenditure of $50,000 in the investigation and exploration of potential oil fields in this province. The exploratory work also will have in view the location and the obtainig of all possible information as to the possibility of developing on Crown lands new coal producing areas. While the field researches for which the Department of Lands is preparing may be taken to be directly primarily to ascertaining whether the province is possessed of oil in any quantity, the possibility of finding petroleum and natural gas will not be lost sight of. It is understood that attention first will be directed to the lands of the Peace River District, in the neighborhood of the Alberta boundary, where more or less perfunctory examination has given rise to the hope that oil in considerable quantity exists. This country is sparsely settled, is without transportation of any but the most crude character, and, if general but somewhat indefinite reports which have been received from occasional prospectors at rare intervals are to be given credence, it is rich in natural mineral and kindred resources. The advisability of the Provincial Government undertaking systematic exploratory work in this area was emphasized by discussion and resolution at the recent International Mining Convention held at Vancouver, B.C.

Advocates More Geological Survey Work.

With reference to the generally admitted need of more detailed knowledge of the resources of British Columbia it is interesting to note comments made by Charles Price-Green, Industrial Commissioner for the Canadian National Railway, who visited the Pacific Coast recently with a party of officials of the Canadian Northern Ry. At present he is making a general survey of the country with a view to the establishment of new industries based on natural resources and, having an intimate and practical knowledge of mining, he has been giving special attention to the mineral possibilities of this Province. In this connection he recommends very complete geological surveys of the mineral lands and a personal canvass of the money-

ed interests of Great Britain with a view to further investments in mineral development. He says that there never was so much money for investment in Great Britain as to-day. As a resutl of the war, money is not held in as few hands as formerly and Mr. Green avers that trust companies are "fairly bulging with funds for investment." Other portions of the Empire have been able to draw large sums from British investors and he believes that proper representation will bring much to the Dominion. Heavy English investors have pointed out to him the necessity for extensive geological survey work in Canada. While having a general knowledge of the mineral possibilities of the country they insist that it is essential that more and accurate information should be available. He recalls that it was extensive geological survey work that opened up the Cobalt area. Mr. Green's investigations have convinced him of the enormous mineral wealth of Canada and he states that British Columbia especially has much of the economic ore that is so largely used in many kinds of English manufacturies. These, he is confident, will receive recognition shortly and that this province is due for general development in respect of its mining industry, As to the iron industry he is not so hopeful at present, as there does not appear to be an assured market, but says that it will come in time.

Prospecting Rights on Indian Reservation.

Two measures passed at the last session of the British Columbia Legislature affect the mining industry in an important manner. One of these provides for the amendment of the "Placer Mining Act," to permit every free miner, during the continuance of his certificate, to "enter, locate, prospect, and mine for gold and other precious metals and stones" upon Indian reservations. The other amends the "Mineral Act" to permit holders of Free Miners' Certificates to "enter, locate, prospect and mine" upon Indian reservations. In extending the right of access to Indian reservations to miners Hon. Wm. Sloan is following out the policy which he enunciated at the time of coming into office, namely, that there should be as little restriction to the finding and the development of the mineral riches of the province as possible. His passage of an Act throwing open the Strathcona Park, a large area on Vancouver Island, to mining operations was directed along this line and the steps now being taken to reach an understanding with the Esquimault & Nanaimo Ry. Co. to abolish the present dual control of the minerals of the Island Railway Belt is another move towards the same end. The existing arrangement with regard to the latter area is that mining regulations promulgated both by the province and by the Railway Company govern the acquiring of title to minerals and their commercial development. Mr. Sloan would have the province placed in full control. As to Indian reservations it is the contention of the Minister of Mines that the province never relinquished its right to the minerals in these lands and he quoted from a document fifty odd years old to prove that this principle always has been maintained by the province. The result is that large new areas are thrown open to the prospector and it is felt that the mining industry will receive a material fillip in consequence of this action.

These amendments to the "Placer Mining Act," and the "Mineral Act" of the Province of British Columbia do not come into effect until proclaimed law by the Lieut.-Governor of British Columbia. The Dominion Government, it should be explained, is the legally constituted guardian of the Indians and it may take the position that the Province has no authority to permit miners and prospectors upon Indian Reservations for purposes of engaging in mining. It will be necessary, therefore, before the said Proclamation is issued for the province to come to some understanding with the Federal authorities on the point and this matter already is being taken up by the British Columbia Administration with Ottawa in the hope and belief that it will be possible to arrive at an amicable settlement. That prospectors should be barred from operating on Indian Reserves is held to be unreasonable on more than one premise, but one of the most forcible advanced is that the ordinary holder of private property, under the mining laws of the country, cannot withhold the privilege to the miner of entering upon his land for the purpose of mining providing he puts up bonds assuring the land proprietor of indemnity should the work undertaken result in damage to the said property. It, therefore, very properly is asked: Why should the Indians be singled out for very special treatment in this respect?

Reopening Anyox Plant.

Little difficulty apparently is being experienced by the Granby Consolidated Mining & Smelting Company in obtaining the 1,200 men necessary for the re-opening of its plant at Anyox, B. C. Very shortly after the announcement in Vancouver that the men were needed upwards of 300 were signed on, many of them being returned soldiers. As many of those being taken on are mechanics, which it may be stated was not expected, it may be presumed that the company's requirements soon will have been satisfied, the Anyox plant completely manned and in full operation.

Operating at Copper Mountain.

Operations have been commenced at Copper Mountain by the Canada Copper Corporation. Many employees who have been residing at Allenby, B.C., have moved with their families to the mountain for the season's work.

French Complex Ore Reduction Co.

The French Complex Ore Reduction Company, which has a plant near Nelson, B. C., designed to experiment in the treatment of the complex ores of this province, was granted $25,000 by the Provincial Government in 1918, the same to be a charge on its assets. Of this amount the Government held back a sum to meet back interest payments on bonds previously guaranteed by the province on behalf of the company. Thomas French, manager for the company, claimed that this seriously handicapped him in the work he has in hand and made representations along this line to the mining committee of the British Columbia legislature during the late session, As a result it is announced that the Government will release to him $7,906, which represents the total of the aforesaid interest. Mr. French states that, providing this financial relief is forthcoming without delay, thus obviating unnecessary overhead expense, it would be sufficient to enable him to demonstrate the commercial feasibility of the French method in the treatment of complex zinc ores. Owing to past delays he states that his expenses have been excessive.

Initial Dividend Paid by Belmont Surf Inlet Co.

Considerable interest has been created in Provivncial Mining Circles by the recent declaration of an initial dividend of a 5 per cent. by the Belmont Surf Inlet Mining Company. The company has a capital of $2,500,000, and has spent about $1,500,000 in the installation of a plant. The ore, which runs from $12 to $15 a ton in gold values, is concentrated at the mine and then shipped to the Tacoma Smelter. Considerable of the stock is held in Vancouver, Victoria and other British Columbia cities.

Title to Coal Lands Still in Doubt.

When the British Columbia Legislature prorogued a few days ago the Lieut-Governor withheld his assent to one of the measures passed, namely, the Settlers' Rights Act of 1919. This is the Bill which would have given the old settlers or their dependents, with homes in the Esquimalt and Nanaimo Railway Belt on Vancouver Island a further opportunity to make application for the coal rights in connection with their property. It is not necessary to go into the history of this matter again, it being sufficient to say that the issue now is straight cut betweent the jurisdiction of the Dominion and the Province and that the stake to those directly interested is title to a large section of coal-bearing lands of the Island. On the question of jurisdiction the province maintains that it has absolute power with respect to the administration of matters pertaining to civil and property rights, within which classification comes the proprietorship of the coal referred to. Just what position the Dominion Government takes it is not so easy to define, but that it is responsible for the Lieut.-Governor's action in refusing to give his assent to the enactment of the Legislature there is no doubt. It may be that its argument is that title to surface and under-surface rights in these Island lands passed from the Province to the Dominion, and from the latter to the E. & N. Co. in 1884; that the E. & N Co. since has sold the under surface rights to the Canadian Collieries (D) Ltd., and that the latter, having raised a considerable sum on this security, should be protected, if only in justice to the bondholders. In other words the Federal authorities possibly take the view that there was a legal and valid bargain between Province and Dominion and the Railway Company and that, bad bargain as it may now be considered from the standpoint of the Province, and inadequate as may have been the conservation of the rights of settlers or squatters, "a bargain is a bargain," and should be maintained inviolate. It is to be noted that, because of the action taken by the Dominion Government, the Province finds itself in the position of being forced to defend its right to the sole administration of "property and civil rights" within its domain. These rights are part and parcel of the "Terms of Union" and it is considered most serious, apart altogether from the rights of the Canadian Collieries or of the settlers affected, that the Federal Government should so interfere with Provincial legislation of this character. It is very probable, therefore, that both because it believes the settlers have a good case and have been unjustly treated and because the powers granted the provinces under Confederation must be upheld that British Columbia will not allow the matter to drop where it now stands.

Arising out of the Settlers' Rights Act of 1917, an action was heard recently before the British Columbia Court of Appeal. This measure has force and effect for about a year before it was disallowed by the Dominion Government and in that period Provincial Licenses were issued to a number of settlers. A few of the latter sold to the Granby Consolidated Mining & Smelting Company, which, as a result, commenced development work, the fruit of which is the new and flourishing colliery at Cassidy's, Vancouver Island. To maintain what it considers to be its rights the E. & N. Railway Co. entered suits against a number of those who thus acquired Provincial Title, among the latter being those who had disposed of their holdings to the Granby Company. A *lis pendens* was filed against the lands and the Registrar-General refused to register the grants to the Granby Company until this had been removed or dealt with. It was argued for the Granby Company that the Registrar-General had no right to attempt to exercise judicial discretion, but should have accepted the documents and allowed the courts to decide the questions of law. This view was taken by the judge. While the 1917 Act was disalloyed subsequent to the Registrar's refusal, it is not thought that that will affect the decision, but that the grants must now be registered pending the final decision of the courts.

There has been argument before the Provincial Appellate Court on two other actions over these coal lands, the E. & N. Ry. Company seeking to have the licenses granted to Mrs. Dunlop, an aged settler, and to Messrs. Wilson and Mackenzie, as executors of the Ganner Estate, set aside as being null and void. In this connection it was sought to have the Attorney-General of the Province declared a co-defendant under a practice founded on an Act which dates back to the time of Henry VIII., which provides that a subject in fear of an act of injustice by the Crown may bring the Crown before the Court. The Supreme Court held with this opinion, but the Appeal Court dissolved the Supreme Court's order, the cases will proceed without the Crown being made a co-defendant.

It will be seen, therefore, that, with considerable litigation pending and with the Provincial Government much concerned over what it takes to be the unwarranted interference of Ottawa, the question of title to a not inconsiderable part of the coal lands of Vancouver Island is likely to remain unsettled for some time.

The Eight Hour Day.

Approximately 1,600 surface workers employed by the collieries of British Columbia are affected by the Eight-Hour Working Day law which came into force on the 1st of April. This legislation was passed at the 1918 session of the Provincial House, being introduced by Hon. Wm. Sloan, Minister of Mines. On the last day of the 1919 session, which has just closed, J. H. Hawthornthwaite, the member for Newcastle District, a coal mining centre, asked Mr. Sloan what action was proposed to be taken in view of a request received from the Coal Operators, particularly those of District 18, which includes Eastern British Columbia and the Province of Alberta, that the application of this law be deferred. In reply Mr. Sloan stated that the amendment to the Coal Mines Regulation Act to which Mr. Hawthornthwaite referred had been introduced and passed in the year 1918 by the terms of which an eight hour working day was granted the surface workers in and around coal mines. The House was reminded that it was proposed at that time that this legislation should become effective as from October 1 of last year. Owing, however, to representations made as to the existing working agreement between the operators and the

miners in Eastern British Columbia and Alberta, which agreement did not expire until April 1 of this year, it was decided to suspend the Act until that time. Under the circumstances and notwithstanding the representations referred to, the Minister could see no valid reason why the law should be further suspended. Accordingly he had directed that it should be enforced and the District Mining Inspector had been instucted to see that the Act was carried out without qualification. The argument of those who asked for further postponement was based on the fact that the working agreement mentioned has been continued between the operators and miners temporarily and also, it is understood, on the possibility of conditions being disturbed to the detriment of the industry in the face of a general Eight-Hour Day in this Province and no such regulation in the adjacent Province of Alberta.

A policy of selecting labor appears to be the general practice at the mines of Cobalt. Men who formerly held jobs for the reason that no others could be secured to replace them are being gradually let out and returned men and others willing to do justice to their work are being given the preference. As a consequence a higher efficiency is noticeable.

The Nipissing Report.

The annual report of the Nipissing Mining Company just issued, covering the twelve-month period ended December 31st shows the gross value of production for the year amounted to $4,040,446, as against $3,756,889 during the preceding year. Total costs of production increased, however, the cost for 1918 amounting to $1,444,350, as compared with $1,057,987 in 1917. Ore reserves are estimated at 6,005,135 ounces of silver as compared with reserves of 8,076,540 a year previous. Working profits during the year amounted to $2,506,-096, as against $2,700,000. The decline in profits as compared with production is due to the fact that during the year the cost of production averaged 39 cents per ounces of silver produced as compared with a cost of 25 cents per ounce during the previous year. In the annual report the fact is pointed out that no great success was met during the year in the search for new orebodies. In this respect it is interesting to note that during the opening months of the current year just the reverse is the case. This fact is supported by the statement in the report for the month of March where it is pointed out. "Favorable underground developments were met with at several shafts and general operations everywhere continued to be satisfactory."

Ontario-Kirkland.

The shaft of the Ontario-Kirkland, formerly the Hurd property in the Kirkland Lake field, has reached a depth of 320 feet. It is now proposed to drive a cross-cut for the purpose of tapping the main vein which left the shaft at a depth of 195 feet, as well a cross-cutting for the No. 2 and No. 3 veins, all of which parallel in comparatively close proximity. At the point where the slightly dipping vein left the perpendicular shaft it is officially stated values were of a high commercial grade. It is also stated one of the best sinking records so far attained in the Kirkland Lake camp was established by driving the shaft 120 feet in 30 working days.

Temiskaming.

The reported discovery of high grade ore earlier in the week at the Temiskaming mine has been officially denied. Also, it is learned, the completion of the deal for control of the Dolly Varden mine in British Columbia is being held up due to the settlement of various contentious matters relative to the affairs of the Dolly Varden Company.

Contrary to reports the Mining Corporation of Canada is not negotiating for the Silver Cliff mine.

Green Meehan.

Arrangements are being made to resume work at the Edwards & Wright property, formerly the Green Meehan. Plans provide for a comparatively extensive program of exploration work, as well as the mining of considerable low grade ore already developed.

ELECTRIC SPECIFICATIONS AND CONTRACTS.

Mundy, Rowland & Company, of Vancouver and Winnipeg, will undertake the building of power plants, the making of specifications covering installation of motors, pumps and waterwheels.

They have to their credit the building of large power plants, and on the Pacific Coast are completing one of the largest power plants recently installed.

Dolly Varden.

With respect to the controversy between the Dolly Varden Mining Company, owner of valuable mining property in the Alice Arm District, and the Taylor Engineering Company, which went into liquidation because of the financial burden involved in the construction of a railway from tidewater to the first mentioned company's mine, it has been stated previously that an investigation was undertaken by a special committee of the British Columbia Legislature; that a report was submitted to the Provincial Legislature; and that the report was referred back because the Temiskaming Mining Company, of Toronto, which held an option of purchase on the Dolly Varden Mine and other holdings wishes to present evidence as to its position. Since then the latter company's testimony has been taken, but it failed to affect the committee's report which was again presented without change and adopted unanimously. A. M. Whiteside, chairman of the committee, in explanation made the following statement:

"Every effort has been put forth by the committee to do justice by all parties. The committee came to the conclusion that the only manner in which to treat the matter fairly was to consider the two parties according to their investments and claims. The mining company had an investment of $640,000, while the Taylor Engineering company had a total investment of $462,000. We have said that the mining company should make the claim of the appellant company a charge on the assets, with the privilege of paying off the claim, and if this was not desirable they could have their claim taken over by the Taylor Engineering Company and have it paid off by that company. We contend there was no hardship contained in this conclusion and also that if the Taylor Engineering Company could not prove itself in a position to complete the work to the satisfaction of the Minister of Railways they should lose all they had put into the undertaking."

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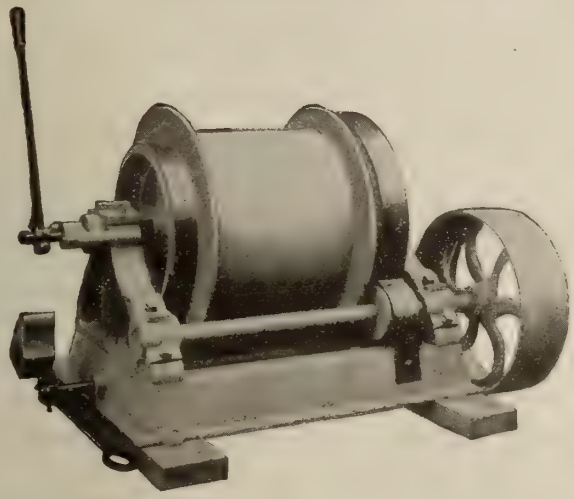

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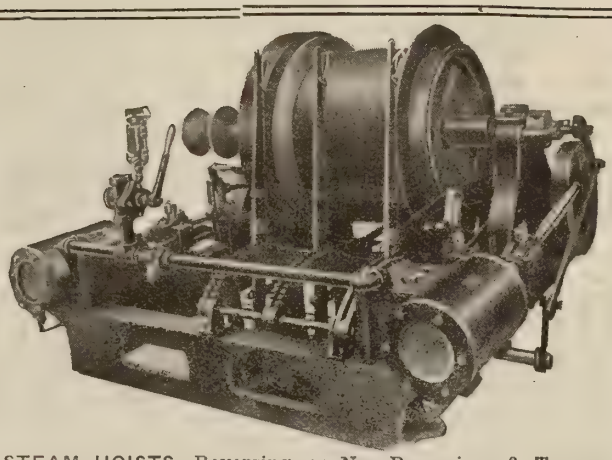

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Smelter Smoke at Trail.

In the vicinity of the Trail (B. C.) Smeltery, Consolidated Mining & Smelting Co. of Canada, there is a considerable agricultural area the inhabitants of which have been complaining of the injury to their crops caused by the smoke from the company's plant. The same condition, possibly, occurs elsewhere in the province, but it is understood that the specific case mentioned and the petitions received as a result from the farmers affected, led to enactment at the last session of the Provincial Legislature designed to give the cultivators of the soil some relief. It is entitled the "Industrial Operations Damage Compensation Act" and, it is almost needless to say, is not popular among those identified with the control and management of smelters and other industrial concerns. The chief clause of this measure sets out that any company, owning or operating any reduction works or industrial plant, or proposing to acquire or operate any ore-reduction works or industrial plant, "make an agreement with the owner of any land for payment to the owner of compensation for any damage or injury resulting or likely to result to the land, or in respect of its present or future use, from the operation of the ore reduction works or industrial plant." If the company and the land owner cannot come to an agreement it is provided that application may be made to the Public Utilities Commission for the fixing of the amount of compensation rightfully due the latter. This, of course, constitutes a recognition of the claims of the farmer and there is no doubt that it will result in a settlement of the issue between industrial companies and those agriculturists in the province who have felt themselves aggrieved, but with no means of obtaining redress.

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Huff Electrostatic Separator Co. Move to Their New Plant.

The Huff Electrostatic Separator Co., which has been located for the last fourteen years at 60 India Street, Boston, Mass., has recently acquired and fitted up a large plant at Arlington, Mass., a suburb of Boston, to which it has moved its offices, ore testing and chemical laboratories and works. It maintains a well equipped laboratory for the purpose of making either preliminary or complete tests showing the results that can be obtained commercially in the separation or concentration of minerals, abrasive materials, and reclaiming valuable content of many waste materials by the Huff Electrostatic Process. Mr. H. B. Johnson, an expert on graphite refining, is General Manager of the company.

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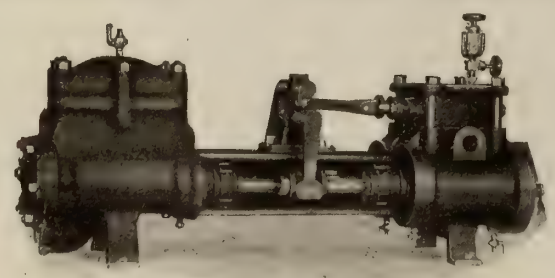

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:-: EDITORIAL :-:

MINING INDUSTRY WANTS A REPRESENTATIVE ON CAPITAL AND LABOR COMMISSION.

At a recent meeting of the Council of the Canadian Mining Institute, it was decided to take action to obtain for the mining industry representation on the Federal Commission appointed to study the relationship between capital and labor. The name of Mr. D. H. McDougall, president of the Canadian Mining Institute, has been suggested in this connection. Mr. McDougall is well qualified to represent employers of labor. He has had much experience in the iron and coal industries, having advanced to the Dominion Iron and Steel Company before he became president of the Nova Scotia Steel & Coal Co. He is a successful manager, which means that he understands the human element in industry, as well as the technical side.

It is scarcely likely that the Government will fail to recognize the claim of the mining industry to be represented on this important Commission. That so important an industry should be overlooked when the commission was named is indication of the justice of the claim of those who have recently been agitating for more activity in public affairs by those engaged in the mining industry. We are pleased to see the Mining Institute giving evidence of its interest in this matter, and we hope that no effort will be spared to convince the Government that the mining industry must be recognized.

THE PROSPECTOR'S POINT OF VIEW.

A considerable number of leading prospectors have voiced their opinion with regard to the suggestion that claim holders are likely to be called upon to perform annual instalments of assessment work, or the alternative of paying the equivalent in taxes. Opinion seems to be largely in favor of some such measure, provided it can be applied with a minimum of hardship to the genuine prospector, and with a maximum of penalty for the "land grabbers."

Certain objections have been raised. Those following agricultural pursuits are permitted to secure patent for 160 acres of land, **with the mineral rights thrown in,** for living upon such land for a few months each year, and for clearing a few acres of land, plus fifty cents per acre. Why then should the claim holder be compelled to not only comply with doubly severe obligations, but also be compelled to perform such duties perpetually under penalty of forfeiting all rights to such property, provided his efforts are relaxed for any one period of twelve months? As the mining laws now stand a forty-acre mining claim costs its holder about $1,250 by the time patent is secured. It follows that the cost of 160 acres would amount to approximately $5,000. After reviewing this objection from various angles, it is not difficult to recognize its value. It brings to mind the question of just what affect would added compulsory working conditions or expense have upon the mining industry. Without some definite goal, that of securing a patent in due course and the attendent relief from further work, how many claim holders would stick with their claims and perform even as much work as under the present law? On the other hand, under a system of work or pay, under penalty of forfeiture, mining claims should have greater value because they would not become part and parcel of an idle area in which all work may have ceased and toward which all or nearly interest may have died.

Looking at the question from a prospector's point of view, and supported by a great deal of comment from leading prospectors, it seems that some system of work or pay, although at first appearing as likely to add to the prospector's burdens, should really enure to his general benefit. For instance, should the regulations be changed so as to require 30 days work to be done during the first three months following the staking, followed by 60 days during each of the following two years, then, instead of performing 90 days work during the third year as required under the present law, reduce the amount to 30 days for the third and all subsequent years. In this way, the claimholder, by performing the amount of work as at present required before patent, would hold the claim for a period of five years and three months, plus the expiration of an additional twelve months before his claim would become forfeited, or a total of six years and three months. By that time, in the great majority of cases at least, it would be possible to determine whether or not conditions warranted additional expenditure. If not, the claim would revert to the Crown and not be permitted to become idle. In this way the prospector would always be confronted with an area in which assessment work each year would make it active, or an area through which he could roam at will in search of hidden treasure. This would be in sharp contrast to the present situation in the majority of mining camps, where a few operating mines form the centre of activity, and where, for miles around, large areas of territory are held in idleness, under patent, and with no severe obligations to its holders.

Another point that should perhaps not be lost sight of is this: In cases where claim holders should decide to not perform the year's assessment work, but, instead, pay its equivalent in the form of taxes, the district in which the property is situated should receive the benefit of such taxes, a reasonable part of such money to go toward providing roads, trails, bridges, etc., for the general benefit of all concerned.—J. A. McR.

SHOULD ONTARIO MINING COMPANIES BE REQUIRED TO SPEND PART OF PROFITS IN PROSPECTING?

Officers of mining companies operating in Ontario will find something worth considering in the letter on "Encouraging Prospecting," which appears on another page. It is suggesteted that a tax of 2 per cent. be levied on all mining profits, the money thus raised to be expended by the company paying the tax in actual pro-

specting. The work would be under the sole supervision of the company and would be for the company's sole profit.

This appears to us as a scheme that should appeal to those who have been fortunate enough to make large profits from mining operations. We feel sure that they are ready to do their part towards making new discoveries if some reasonable plan is suggested. All know that discovery is the first essential in the mining industry. All wish to encourage the prospector. All will have more opportunities of expanding their business and perpetuating their company activities if more new discoveries are made. The scheme proposed not only points out a way in which companies can enlarge their operations, but affords them an opportunity of contributing towards the general welfare of the country by speeding up the development of our mineral resources. The prospecting tax would not be a hardship on the industry, but rather a sort of sinking fund for the provision of new discoveries. It would be at the same time a guarantee to the public that some part of the profits from successful mining ventures would be devoted to searching for other ore deposits. We believe that the interests of the mining companies and the general interests of the province would both be served by the adoption of a scheme of this sort.

GEOLOGICAL MAPPING OF MINERAL AREAS.

In the letter on "Encouraging Prospecting" will be found suggestions as to ways in which the Ontario Government might help prospectors in their search for mineral deposits.

With regard to geological mapping, the chief complaint which we would make is that there is not enough of the kind that has been done in some parts of Ontario. The Ontario Bureau of Mines, has through its geological department contributed greatly to the discovery and intelligent development of mineral areas. Unlike our English friends, the geologists of the Ontario Bureau of Mines have worked closely with the prospectors and development companies. We have had many instances of pioneering work by geologists in Ontario under the leadership of Dr. W. G. Miller, the Provincial Geologist. A serious attempt has been made to map promising areas ahead of the prospector, or along with him. Real assistance has been given.

Those who have prospected or developed prospects in such areas as Cobalt, Porcupine, Kirkland Lake or Gowganda will certainly acknowledge that the work of the geological department of the Ontario Bureau of Mines has great economic value. The reports and maps by Miller, Knight, Burrows and Hopkins have been especially useful.

But there seems to be no proper realization of the magnitude of the mining industry which could be built up in Ontario. We are making progress, but is far too slow. We are not organized on a scale which comes anywhere near approaching that which is needed. The geological mapping of promising mineral areas in this province; preliminary mapping of new areas and more detailed study and mapping of areas that are being developed, is proceeding at a pace which would indicate that the Government is too easily satisfied. The record of what has been done is a good one; but in our opinion it is only an indication of what might be done. Possibly, if the past record were not so good it would be easier to direct attention to the possibilities ahead.

When it is realized that our progress is far too slow, that it does not measure up to the possibilities for mining development in Ontario, it will be found difficult to suddenly enlarge the scale of operations. Geologists capable of doing really useful work for prospectors in Ontario are not made in a day or a year. Even should the Government realize the necessity for speeding up the geological work, it will be found not easy to do so, owing to lack of suitably trained and experienced men.

This brings us to another matter, that of remuneration for geologists engaged by governments. There has been too much made of the honor, glory or "kudos", that accrues to scientifically trained workers for their contributions. The contributions would be just as good, and probably better, if the workers were properly paid. The industry is suffering from a failure to realize that the geological mapping is not proceeding at a proper pace, that there are too few workers, and that we are unlikely to have enough until this department of the industry is organized on a proper basis. It has been the fashion to get geological work done by bestowing praise. Only a limited number of men can be fooled in that way for a long time. The praise may be sincere, and there is often no realization of the way in which acceptance of praise instead of pay for work done reacts on the industry and delays development of our mineral resources.

The professor who tries to impress his students with the great value of a "halo" for scientific work accomplished is sometimes unwittingly delaying development. Geologists trained in our universities remain for a varying length of time under the influence of the "glory" doctrine. Our objection to the doctrine is that it delays development of mineral resources. The work of our Ontario geologists would be more useful if their salaries were doubled and they were given each several assistants at their present salaries, so that they might train up a body of men who would be able to do the required work on a scale that would be more in keeping with the natural wealth of the country. The purpose of mining is to add to the wealth of the community, and money expended in geological mapping would bring big profits.

There has been much talk lately of the failure of the public to realize the value of the work of technical men. There is good reason for such complaint, but so far as those who are engaged in mining are concerned, and we can speak of geologists in particular, the public is not so much at fault as the technical men themselves. The geologists have been buncoed. They have been handicapped by the fact that there has been confusion be-

tween geological work done solely to satisfy a thirst for knowledge, sometimes called "pure" science, and geological work done to gain information that will have a money value in the development of ore deposits. It is not surprising that those who wish to attract students away from industry should endeavor to surround such work with a halo in order to make it attractive. But those whose work is in the industry, those who are applying science to industry in order that they and the whole community will benefit, need no praise from their brother scientists. What they need is a fuller realization of the money value of their work.

We have no desire to belittle the geological work that is done without regard to economic results, for it is not always easy to determine what the actual value of such work will be. But where the purpose of the work is economic there should be compensation in money, not merely in praise. Labor and capital are expended in the mining industry for a definite purpose; to make profits. In order that the industry should grow properly, all those connected with it should have that purpose clearly in mind, and all should see that they share in the profits. If there is any department that is not receiving its share, then that department will lag behind and hold back development of our resources, for it will fail to attract a sufficient number of men who have a clear view of the purpose of their work.

It is generally admitted that development of our mineral resources is greatly to be desired, and there have been pointed out ways in which the government can help to speed up such development. Much of the work must be left to private enterprise; but the geological mapping can well be done by governments, provided that those in charge of such important work are properly paid for their services. A certain number of excellent workers have been kept in the service in spite of inadequate salaries; but the industry is not satisfied with this condition of affairs. If the government is to assume a part of the work in developing our mineral deposits, it should be more strongly impressed with the magnitude of the work to be done and endeavor to get ahead faster. At present, in Ontario, there is a serious endeavor being made by the geological staff of the Bureau of Mines to keep up with the prospector. Mapping is done each season in areas where prospectors are working; but there should be twice as many geologists doing such work, and there should be others of the same calibre mapping areas ahead of the prospector and others doing more detailed work in areas being developed.

COBALT SILVER MINES.

The shipment of nearly $1,000,000 in silver bullion in addition to the large shipments of ore during the month of March from the mines of Cobalt is ample evidence of very satisfactory prosperity in the silver camp. With the largest consignment of bullion ever shipped to the Far East even now on its way to India and the flow of white metal expected to continue, and, with the United States likely to be a purchaser for considerable time to come, there are no visible signs of even the possibility of a recession in the quotations for silver. While work is being carried on at a maximum capacity at the mines of Cobalt, activity is increasing in the Gowganda and Elk Lake fields. Also, more or less interest is once more centering on the Casey-Cobalt area.

EXPANSION OF GOLD MINING IN NORTHERN ONTARIO.

At Porcupine the Hollinger Consolidated is beginning to reap the advantages from expenditures on equipment during former years. The entire 160 stamps are falling. Shareholders who have been denied maximum dividends in recent years should now reap profits in multiplied form. During the last half of the current month the mill of the Dome Mines will again be tuned up, after having lain idle and silent during the stress of war. Indeed life in the entire Porcupine camp is being rejuvenated. The same is true in the Kirkland lake field. The Kirkland Lake mill set in operation two weeks ago is giving satisfaction. The Lake hore mill is operating at full capacity. The Teck-Hughes mill is in operation, and with a reasonably short time the mill of the Tough-Oakes Gold Mines will be re-opened. Before the end of April the construction of the Wright-Hargreaves mill will be in full swing, and by fall at least five mines in the new camp should be producing gold.

ROYALTIES UNDER DOMINION LAWS.

Editor, Canadian Mining Journal:

Sir,—I beg to call your attention to an article which appeared in The Canadian Mining Journal dated the 9th instant, entitled, "Royalties under Dominion Laws," in which you state that the change from a freehold system to a leasehold system, insofar as Federal mining rights are concerned, was made by Order-in-Council, and has stirred the interest of all who were seriously concerned with the future of mining development.

Would you permit me to make a correction in this article? The change to which you refer was not made by Order-in-Council, but by Section 8 of Chapter 27, 4-5 George V., assented to on the 12th day of June, 1914.

This change in the provisions of the Dominion Lands Act rendered it impossible for the Department to frame regulations for the disposal of mineral rights by patent, but by lease only, and from the date upon which this legislation was assented to the form of final title to all mining rights acquired subsequent to that date must necessarily be made to conform to the provisions of this legislative enactment.

Yours, etc.,

H. H. ROWATT,

Ottawa, April 23, 1919. Controller.

Mining Lands and Yukon Branch,

Department of the nIterior.

Ophir.

The ore shoot recently encountered at the Ophir property, although apparently more important than the one discovered a few weeks ago, has pinched out. Further lateral work is proceeding with fair promise of encountering additional shoots and with the hope of some one of these proving of substantial importance.

-:- Encouraging Prospecting -:-

Editor, Canadian Mining Journal:

Sir,—At the recent International Mining Convention which was held in Vancouver on March 17th, 18th and 19th, the British Columbia Government officially presented to the visiting delegates the advantages which that Province offered to the prospector. This was done through the Government engineers in charge of the six mineral survey districts into which the province was divided in 1917. Each engineer, acting on instructions from the Minister of Mines, gave a paper at the Convention dealing with the mineral resources and possibilities of his particular district, suggesting what districts offered the greatest chances for success to the prospector. These papers were all optimistic, in fact very optimistic, and the result of this official advertising cannot but be helpful to the province, not only through attracting prospectors from other provinces and states as well as holding their own prospectors, but by attracting many new men into the prospecting profession, and it is well known that this profession generally holds its members for life.

Manitoba is endeavouring to obtain control from the Federal Government of the natural resources of that province and, if successful, will make a strong bid for prospectors to explore that portion of the great pre-Cambrian Shield which is within her boundaries. The wonderful success attained by the few prospectors in that district in the past augurs well for the future and if, as suggested, the Manitoba Government encourages the opening up of that district by means of railroads, by subsidizing smelters, and even by "grubstaking" prospectors, we may expect many a northern Ontario pioneer to transfer his activities to the neighbouring province.

Several exploratory parties are to explore parts of the hinterland of Quebec this summer and the Dominion of Newfoundland has already taken more than one well-known explorer from northern Ontario.

The Province of Ontario is at present short of prospectors. Even before the war the number was decreasing. During the war many enlisted. A considerable number of these men have either made the supreme sacrifice or have returned physically unfit to continue their work in the bush.

The discovery of a new camp of sufficient importance to cause boom conditions for a couple of years would solve the problem, as many new men would be attracted to the game, but the probabilities of discovering a new camp are lessened by the very fact we are considering—the lack of prospectors. The necessity of the Province of Ontario holding the few prospectors it has against the inducements offered by other provinces, and the equal necessity of adding to this number must appeal to every person interested in the future of the mining industry in this province. It is unfair to point to the advancement made by this province during the past fifteen years and argue from that, that the future of the industry is assured without adopting any definite scheme for encouraging prospecting. It must be remembered that it was the discovery of Cobalt by the accident of railway location which gave Ontario a new industrial class, the prospectors. Before that there were a few prospectors in Sudbury, in western Ontario and in Hastings county, but the number was very few. As against the argument of *laissez faire*, it should further be remembered that Ontario before 1903 as the richest and the most thickly populated and the most developed of any of the provinces of the Dominion, and yet it was practically unrecognized as a mineral province. The industry of prospecting, developed by the accidental discovery of Cobalt, directly resulted in the discovery of other silver areas and of the enormous gold area to the north.

The prospector is the first esential to the discovery of the mineral resources of a district such as northern Ontario, and yet, after the discoveries are made, it is not the prospector as a rule who reaps the greatest benefit from the development of these mineral resources. It is true that in many instances in the north the prospector made a fortune, but even in these cases the prospector did not desert the country. He either became an operator, or he used part of his money in grubstaking other prospects. But those people who reaped the greatest benefit form the rich mineral resources of northern Ontario, that is those who received dividends, do not as a class expend any appreciable amount of their profits in attempting to discover other mineral bodies to replace the ones the exhaustion of which is paying them large returns on the monies invested. Many of these people did not even participate in the gamble or developing the prospect. They bought it when the future of the property was assured. Would it not be fair to ask these people, in return for the profit they reap from the exploitation of the mineral resources of the province, that they expend a small proportion of these profits in prospecting for other valuable ore bodies the discovery of which would enormously increase their profits. A manufacturing industry does not hesitate to use part of its profits in seeing new fields. Many mining companies are anxious to develop new properties, but if we have not the prospectors, we cannot have the prospects to develop.

I would suggest that every mining company should use a small portion of its profits, say 2 per cent, in prospecting. During the past 15 years the mines of Ontario have paid not less than $130,000,000 in dividends. The proportion of this I have mentioned would amount to $2,600,000, or sufficient to have kept an army of between 250 and 300 prospectors in the field every year during the past 15 years. The mining companies are in a better position than anyone else to undertake and supervise this work. They have their own engineers acquainted with conditions in northern Ontario. These engineers would be able to intelligently direct what districts their prospectors should work in, and would decide whether any discoveries made were worthy of exploration. If encouraging locations were made, no time would be lost in seeking capital, or in arranging terms of purchase and any development work done would be done intelligently with a view to finding out as quickly as possible the value of the property and not with the idea of sale. Further, the company's engineer would know when to quit, and money would not be needlessly wasted. Such a scheme would almost certainly meet with success in a proportion of cases and would prolong the life of the company. The pro-

spector would require to be given an interest to ensure his best efforts and, during the winter months, would no doubt be employed in some capacity at the mine. I do not think the shareholders would object to such a requirement. The tax would be levied only on paying companies; it would not be a burdensome tax; the money would be expended in the interests of the company and would be spent by the company's own officials.

In addition, and to round out such a scheme, there should be aid on the part of the Government. This aid should follow the policy at present pursued by the Government, in mapping geologically, ahead of the prospector if possible, and in trails and roads, the free identification of minerals, the throwing open of any districts withheld from surveying, and making the Mining Act as flexible as possible. The last would necessitate the removal from the statutes of the obnoxious and foolish "discovery" clause. In addition, I think the Government should start night classe for prospectors in centres like Sudbury, Haileybury and Timmins. In Sudbury and Haileybury these classes could be in connection with the mining schools at these towns, utilizing the mining teachers already on the staff. Mineral collections containing all Ontario ores and minerals liable to be found in Ontario should be at all recording offices and at the night schools. A certain number of free assay coupons, good at the Provincial assay office, should be given with each miner's license. This would not be necessary for the mining company prospectors, but would be of advantage to the independent prospector. Further, a Government testing plant, where small lots of ore would be sampled and purchased by the Government from the prospector, would encourage the prospector to develop his claim.

To summarize, I would suggest the following as one way in which active prospecting could be encouraged in Ontario:

1. The levying of 2 per cent tax on all profits in mining, such money to be expended by the company paying the tax in actual prospecting and under their sole supervision and for their sole profit.
2. Increase geological work by the Government.
3. Government night schools for prospectors.
4. Collection of minerals at all Government recording offices, night schools, and other localities where of advantage to the prospector.
5. Five free assays with each miner's license.
6. Government testing plant, where small lots of ore could be sold.

Yours, etc.,

A. READER.

Toronto, April 24, 1919.

GOVERNMENT PROSPECTORS.

The Great War Veterans' Association, Winnipeg branch, has had before it, proposals concerning the development of Canada's mineral resources. The following resolution was passed a few weeks ago:

WHEREAS it is essential in the interests of Canada and of the returned soldiers that the natural resources of this country be determined and developed as quickly as possible;

AND WHEREAS during the last forty years the work done by the Geological department is infinitessimal compared to what remains to be done with regard to the determination with a view of development of said resources;

AND WHEREAS it is considered that four or five hundred trained parties each under the direction of a competent mineralogist could with great advantage be sent out to examine different sections of the country each summer, particularly that portion of the Dominion lying between the Great Lakes and the MacKenzie River, and that all necessary instruction and training could be given to these parties during the winter;

NOW THEREFORE BE IT RESOLVED by this, The Great War Veterans' Association of Canada (Winnipeg Branch) that the Federal Authorities be requested to take up this matter as quickly as possible with a view to tabulating the mineral and other resources of the unexplored parts of this country in the shortest possible time and to training the necessary number of returned soldiers (say from 10,000 to 12,000) without delay, provision also being made to see that those discovering valuable resources obtain a fair share of the profits by way of royalty or otherwise in addition to such salaries as they shall receive as Government Prospectors.

Lake Shore.

During the month of March, according to official figures to your correspondent, the Lake Shore Mine produced $45,364.46. This is the highest month's record in the company's history. Mill heads continue to average between $24 and $25 to the ton. The mill treated an average of a fraction under sixty tons daily for the period. Satisfactory progress was made underground.

Porcupine Towns Growing.

At last it has been definitely stated that the mill of the Dome Mines will be set in operation on a moderate scale during the last half of the current month, and that from then on operations will be rapidly speeded up. This official announcement followed a meeting of the directors held early in the week, in New York, at which time three new directors were added to the Board.

At the present time the number of mine workers engaged in the Porcupine field exceeds the total number engaged at the mines of Cobalt. This number will be still further increased by perhaps fifty per cent. during the next few months. As a result of this, the camp is booming. Housing capacity is not only taxed to the utmost, but is quite inadequate to meet the great and growing requirements, and an extensive building program appears to be imperative. Real estate, as well as interest in mining is rising rapidly. Instances on record show an increase in shares of mining companies some times amounting to two and three hundred per cent. The same is true of real estate.

B. C. Resources.

British Columbia,(Mr. Casey believes, has the greatest natural resources in the world, and the fact that they have hardly been touched is surprising. He is much impressed at the extent of water power to be had as well as minerals. The wonderful prairies with their productiveness, east of the mountains and the great harbors, he believes Vancouver is the natural doorway to the east and that there is evidence of a great prosperity and development close at hand.

The B. C. climate is superb and none better anywhere.

Mining Taxation in British Columbia

A review of the taxation legislation, passed at the session of the British Columbia Legislature just prorogued, shows that no important changes have been made insofar as the mining industry is concerned. The most noteworthy alteration is an amendment which brings the coal mining companies under either the Royalty tax of 10 cents a ton on all coal produced or the Income Tax Assessment, the Government having the power to select whichever will yield the greater revenue. Coal used in the manufacture of coke is not taxed until it becomes coke, when it is assessed 10 cents a ton. Two other amendments passed have to do with the regulations to govern assessors in arriving at what is known as "Taxable Income." One of these provides that "income derived by non-residents from interest on loans, salaries or directors' fees where these have been otherwise assessed with the Province," shall be exempt, and the other specifically states that no deduction shall be permitted for depletion or exhaustion of a mine.

The amendment relating to the collieries is noteworthy as indicating that the Provincial Government does not intend, as was suggested, increasing the 10 cent a ton tax to 25 cents a ton. Those referring to the Income Tax are worthy of special attention only because they make clear that there is no present intention to meet the wishes of some of the large metalliferous mining companies of the Province, the chief of which are that the income tax should allow the deduction of interest on capital borrowed from outside for the development and operation of the property, in other words, that taxation should be based on net and not on gross income, and that there should be further deductions for depreciation and for exhaustion of mine, etc.

The taxation problem is a serious one in British Columbia, as in fact it is throughout Canada at the present time. The Government two years ago announced its intention to attempt to revise, refine, and put on a more scientific basis its method of deriving revenue. With this end in view Prof. Robert Murray Haig, Ph.D., Assistant Professor of Economics at Columbia University, was appointed to make a special investigation of conditions and to offer suggestions for total improvement. A Taxation Board also was named to conduct thorough and detailed research work in conjunction with Prof. Haig to the end that a comprehensive measure might be prepared for the consideration and guidance of the Government. The Taxation Board's report, with which was coupled that of Prof. Haig, was laid before the House during the last Session, and some of its comments and recommendations in regard to the mining industry are of interest.

The Taxation Board submits what are termed its first and second reports, and in its former deals with mining as follows:

Re Allowing for Exhaustion of Mines.

"This Board, after hearing the evidence submitted and the pleas made to support the proposal that such an allowance be made, cannot recommend that any such allowance should be made before income-tax is levied on net profits; for these reasons:—

"There is no law we have found providing for such in any country whose laws we have inquired into where the taxation on mines is a tax levied on the net income therefrom, and in England the decisions of the Courts are clearly against it. It is safe to assume that before capitalists invest money in a mine they will know with a great degree of certainty the value of the ore-deposit therein, or, rather, they will have some proof that there is enough ore to justify the venture, and will believe that in the operation of producing and selling the product of the mine they will be able to make enough profits to pay interest on the capital invested and create a sinking fund to replace the capital invested before the mine is exhausted.

"They will be guided by the same principle by which a teamster is guided when he buys a horse, who expects to make enough profits from its use as will pay for feeding it and pay for another to take its place when it dies or is no longer able to do its work.

Re the Mineral Tax on the Value of the Ore, 2 Per Cent.

"The Board recommends the continuance of this tax, as it is levied in substitution for all taxes which might be levied upon the land from which the ore or mineral is taken, a tax on the estimated value of the ore in the ground, and for the personal property used in the working of such mines.

"The great efforts that have been made to show that to levy this tax and to tax the profits made in the undertaking is dual taxation must fail under a proper analysis of their relation.

"The mineral-tax is imposed on the party who is given possession of the mine, by licence or otherwise, and because he has been given control of it as against any one else in the community and secured by law in that control, and has no relation whatever to the principal or the basis of a tax on net income.

"It is levied on the same principle on which a farmer is taxed for the privilege given him by the community for the exclusive use of his farm, and for the benefits that he receives from the community in the enjoyment of that use, and has no connection whatever with the tax levied on the profits he makes out of the community by the exercise of his energies applied to that farm. And the tax that is levied on farmers' profits is no greater in proportion than the tax levied on other taxpayers who have no privilege or licence to use any part of the domain of the country.

Re Allowing Interest on Capital Invested by a Company in a Venture to be Deducted from Profits before Income Tax is Levied Thereon.

"This Board submits such should not be allowed. First, it is the amount of the net profits made by a company or individual which is the measure of the value of the opportunity given by the community to make such profits. This is the basis for and, indeed, proof of the fairness of a tax on net income.

"And seeing that there is no fixed relation between the amount of capital invested and the amount of

profit derived from the investment, it would work out unfairly to allow such deduction. It may happen — and, in fact, very often does happen—that a company investing half the amount of capital that another company invests will make as much profits from their venture as the other does.

"In support of this recommendation, that interest should not be allowed on capital invested by a corporation, we quote the following from Professor Seligman. He says:—

'In England, the income tax payable on annual profits or gains, according to Schedule D of the income-tax, is advanced by the corporation, and is deducted by it from the dividends on interest due the security-holders, who are then to that extent exempt from the income tax.'

"He says further, 'Taxation of interest on corporate debt is not double taxation, because the coupons, like the dividends, are integral parts of the income; because both bonds and stock together form what is really the working capital from which the income is derived.'

"There is therefore the best authority for not allowing the deduction of interest on borrowed capital before income tax is levied, and this principle will hold, with equal force, against allowing any rate of interest on invested capital being set aside before income tax is levied on net profits.'

Taxation of Coal Mines.

In the Board's second report the submit of taxation of coal mines and the mining industry generally is commented on as subjoined:

"In the draft Act submitted herewith we have provided that the taxation of coal mines be changed to bring the owners thereof under the income tax provisions of the Act. We have done this for the reason, as we believe, that the present system is most unfair as between the owners of the different mines in that it takes, like the old tithe system, a fixed portion of the product without any consideration of the relative cost of production as between one taxpayer and another. The measure of this injustice will be found by comparing the cost per ton of getting coal to the point of delivery for sale from the mine from which coal can be produced the cheapest, with the cost per ton of getting the coal to market from other mines whose output is produced under less favorable circumstances. The inequality in the incidence of taxation under the present Act no doubt discourages the working of mines that afford but a small margin of profit, and militates against the opening of new mines, which in the early days of development are unduly burdened by this method of taxation.

"We have placed the value of coal lands, as such, for assessment at the price at which they can be bought from the Government—namely, $15 per acre. There is no practicable way by which an assessor can determine the value of coal land as such, nor does the value of the surface give any index to that value. Therefore, to place these lands at an equal value for coal-mining purposes is probably as fair a way as can only be discovered by mining the coal. Although the relative value arising from difference of location might be considered as a reason for differentiation in assessed value, yet as this will be reflected in income and compensated for in the equalizing result of net income tax, it need not be considered as important.

"In providing for the taxation of mines other than coal mines, we have followed the lines indicated in our former report; that is, to place in addition to a tax on the net income from the mine an initial tax on the net value of the ore in substitution for all the other taxes that might be levied—namely, a tax on the value of the surface of the land for the purpose for which it is used, a tax on the estimated value of the ore in the mine, and a tax on all the buildings, plants ore in the mine, and a tax on all the buildings, plant and machinery used in or about the mine in connection with its operation. We have left out the alternative given to the Government by the present Act, to take a tax on the product of the mine or a tax on the income from it, whichever is found to be the greater. We submit that this method is wrong in principle and that it should not be followed, as it places an unequal burden on mine-owners in the comparative advantage to the mine with the richest ore and other favorable conditions as compared with other mines not equally favored.

"To put a fixed percentage tax on the net value of ore which costs 20 per cent. of its value to get it, and the same fixed percentage on the net value of ore which costs 80 per cent. of its value to get it, is so clearly inequitable that it has only to be stated to be condemned. Although the principle so condemned is applied in the draft Act submitted, its application to the extent provided finds justification in the fact that the tax so levied by it is in substitution for all the other taxes that might be levied, as above stated, as a real property tax, and for the further reason that in the case of a struggling mine during the early stages of development it may be much less than those taxes would be for which it is substituted.

"In the United States there is probably no subject of taxation which has aroused so much difference of opinion and controversy as the taxation of mines. This has arisen largely from the rigidity of the constitution of nearly all the different States, constitutions which crystallized into law the experience of a period when tangible property was taken as the sole evidence of the ability to pay taxes. The economic changes that have taken place since that time have created new conditions in which tangible property is not only incomplete evidence, but very misleading evidence as to where the "power to pay" is to be found. There is, therefore, in that country great effort being made to change this principle in taxation, and in many of the States some modifications have been made in that basic law. Yet few of them have got quite free from that die-hard notion that all things having a sale value should be taxed on that value irrespective of their nature or use—not yet realizing that it is not the thing or means used in the production of wealth that should be taxed, but that it is the wealth produced that should be made bear the burden of taxation, as that is the only thing that gives the "power to pay."

"Hence we find two impossible things attempted by assessors there—one to value ore in the ground, the other to find out the amount of capital invested in some undertakings. The latter impossibility is stranger than the first, which arises from two causes—one of which is its amazing shrinkage if it is to be made the base of taxation, the other being its wonderful expansion if the interest thereon is allowed to be deducted before the income arising therefrom is charged with income tax. The members of this board have reason to think that no country in the world gives mine-owners

a safer method of taxation than the one submitted herewith, for it practically imposes no taxes on them until their mine reach a productive stage."

Prof. Haig's Comments.

Prof. Haig's comments on various phases of mining taxation are not altogether in harmony with those of the Board, and are appended:

Coal Lands.—"Coal lands are placed in a separate category for purposes of taxation. They are defined as all lands "owned, leased, held under licence, claimed, or occupied by any person for the special purpose of mining coal therefrom, and which is not held or used for any other purpose." These lands are subdivided into two classes. Lands in Class A, which include the lands which are being actively mined, pay the same tax ratio as improved agricultural real estate, 1 per cent. Class B lands, consisting of unworked coal lands, are taxed at a 4 per cent. rate (until 1917, 2 per cent..

"The distinction between the active and inactive coal lands rests on the same theoretical foundation as the distinction between improved and wild land. It is, of course, directly contrary to the fundamental theory of the income-tax. In any reformulation of policy which is attempted with respect to wild lands, coal lands should be included in the consideration.

"The tax on coal land is not of great fiscal importance, the total levies for years past, as set forth in Table VIII., having been in the neighborhood of $50,000 annually. The increase in the rate on Class B land in 1917 causes a substantial increase in the levy. But, if the absence of formal complaint before the Taxation Board be of any significance, the higher rate has not caused great dissatisfaction. Certainly the burden added to the coal-mining interests is in no sense comparable to that added to metalliferous-mining interests by the legislation of 1917.

Table VIII.—Levies on Coal Lands, 1909-17.

Year.	Class A. (Active.)	Class B. (Inactive.)	Total.
1909	$15,234	$ 5,459	$20,694
1910	17,367	5,004	22,371
1911	19,787	22,920	42,708
1912	20,651	23,651	44,303
1913	16,443	34,058	50,502
1914	22,696	33,444	56,140
1915	21,930	37,264	59,195
1916	20,093	36,400	56,493
1917	21,038	74,432	95,470

Allowances of Deduction for Depreciation and Depletion.—"The provisions of the present law make it impossible to deduct depreciation and depletion allowances from gross income in arriving at "taxable income.' This situation does violence to business customs and good accounting practice, and is the cause of much bitter resentment, particularly among the large taxpayers. Depreciation is a very important item in many industries, and, moreover, it varies greatly from business to business. Consequently not only does the taxpayer consider himself taxed on an item of prime cost as though it were a profit, but he also, quite properly, feels himself at a disadvantage as compared with his neighbor whose capital is of a nature which depreciates less rapidly than his own. It is the prevailing practice generally where income taxes are levied to allow reasonable deductions for depreciation, and it is strongly recommended that the law be so amended as to permit such deductions in British Columbia. Allowances for depreciation should never be permitted to exceed the amounts charged for such purposes in the accounts of the enterprise. Repairs, narrowly defined, should be deductible in addition to depreciation, but renewals and replacements are properly covered by depreciation itself.

"Obsolesence is one of the elements in depreciation, but practice varies in regard to allowing it as a deduction in determining income for purposes of taxation. The Wisconsin law expressly forbids such deductions. The United States Federal law permits them, and the language of the new Dominion law is evidently sufficiently broad to allow them at the discretion of the Minister of Finance. In case they are allowed, the deduction should be restricted to the obsolescence which actually accrues. Obsolescence cannot be anticipated with a degree of certainty necessary to make it a proper deduction before its actual occurrence.

"As would be expected where mining forms so large a part of the economic activity of the Province, there is dissatisfaction because of the fact that no deductions are permitted on account of depletion. If the income-tax is to be a tax on true net income, such allowances should certainly be made. This coincides with the prevailing practice in American income tax laws. Depletion is specifically provided for in the new Dominion law, and in the Wisconsin income tax law. Formerly it was permitted only in part by the United States Federal law, but recent changes make possible full deductions.

"In allowing for depletion, the total deduction should never exceed the actual cost in cash of the ores and deposits. If this rule is applied, mistakes in the direction of too great or too small allowances for depletion tend to eliminate themselves. Thus, if depletion is claimed at too heavy a rate, the taxable income in later years would be increased, whereas if the rate of depletion is made too light it can be increased and the tax correspondingly lightened when this becomes apparent.

"Only two points can be advanced in defence of the present practice of refusing deductions for depreciation and depletion. One is that the Province cannot afford to give up the revenue which it would lose if allowances for these purposes were permitted. The other is that it is impossible to construct a satisfactory plan for the determination of the amounts to be allowed as deductions for such purposes. In regard to the first point, it may be confidently asserted that it would be better, in the case of depreciation at least, for the Province to advance rates on the new base to a height sufficient to make up for the loss in revenues. The second point, considered in the following section, is more serious.

Allowance of Deductions for Interest on Borrowed Money.—"At the present time the law forbids the deduction of 'any interest on borrowed capital from which an income is derived, if such interest is paid to a lender who is not a resident of the Province, or to a company as lenders, which company does not transact business in the Province, and which does not pay taxes thereon in the Province.'

"Whether deductions should be permitted for interest paid on money borrowed from non-residents in this particular situation is a question concerning which much can be said on both sides. Fundamentally it involves the whole theory of situs in income taxa-

tion. It may be urged with some appearance of justice that the authority in whose jurisdiction the income is earned should have first claim upon it for purposes of taxation. But British Columbia does not accept this particular theory of situs in a rigorously logical fashion, for no allowance is made for deductions in the case of citizens of British Columbia who have invested their capital abroad. From the point of view of the business, no distinction between resident and non-resident capital can be justfied. As the business-man views the situation, he is permitted to borrow locally without penalty, but can borrow abroad only upon condition that he pay the Province (in some cases) 10 per cent. of the interest. This seems to him to be anything but taxation according to ability to pay. Moreover, when there is such a dearth of local capital it appears to be a direct discouragement to capital seeking investment within the Province.

"However, there is a serious, practical question involved because of the manner in which many of the large undertakings in British Columbia are financed. For often the securities are os arranged that practically all of the money invested is represented by bonds, the true owners of the business appearing as creditors with their money loaned to the concern rather than as investors owning directly their equities. Under such conditions the deduction of interest charges in determining taxable income would convert the income-tax into an excess-profits tax. This would mean added variability in revenues and higher rates if the same yield was to be secured. A combination of a heavier property tax with such an excess profits tax offers interesting possibilities. At the present time, however, it is the opinion of the investigator that the allowance of deductions for interest on outside capital, important though it be, is not so urgent a matter as are some of the other changes, such, for example, as deductions for depreciation. If it can be afforded, it might be well to introduce it with a limitation upon the amount, somewhat after the fashion of the United States Federal income tax law, which permits deductions for interest on indebtedness "to an amount of such indebtedness not in excess of" the capital o fthe company and one-half of its interest-bearing indebtedness. The Wisconsin law, which formerly restricted deductions for interest in a fashion very similar to the Federal law, has recently been changed so as to permit full deduction. Such limitations are open to serious criticism. There is no logical stopping-point between any allowance at all and complete deduction of interest. Moreover, limitaions of this kind have an unfortunate tendency to encourage excessive capitalization. They can only be defended on practical grounds of fiscal necessity.

Allowance of Deductions for certain Fees and Salaries.—"The law at present forbids deductions 'for directors'. fees, and for salaries of persons holding offices as directors, and for the salary paid the president, vice-president, and general manager of any company or body corporate.' The only excuse for such a provision is that, in its absence, the practice would prevail of distributing dividends through the device of inordinately high salaries and fees. A less crude method of preventing such practices is to vest some body with authority to pass upon the reasonableness of fees and salaries. The distinction suggested between resident and non-resident officers is one which is not easy to defend. If a permanent Tax Board is established, the control of these deductions should be made one of its functions.

Taxes Levied on the Royalty Basis.

The Mineral Tax.—"This is a levy of 2 per cent. upon the assessed value of all ore taken from metalliferous mines. The assessed value accepted for the purposes of the Act is the 'smelter return,' defined as the gross value after deducting 'the cost of transporting the said ore and mineral substances to the smelter or mill and the cost of treating the same.'

"As explained, the specific tax was formerly in substitution for income taxes, but this was changed in 1917, and the income tax now applies both to the corporation and to the dividends of such companies forming a part of the taxable income of stockholders.

"The Provincial receipts from the mineral tax for a series of years is shown in Table XI. The largest sum ever received, nearly $300,000, was realized from this source in 1917. This is more than twice the yield of 1915, and three times the yield of 1911. Such excessive variability is a shortcoming of this type of levy. In this particular situation the great increase comes, oddly enough, when revenues from other sources are declining. The explanation is, of course, the abnormal demand for metals due to the war.

Table XI.—Receipts from the Mineral Tax, 1905 and 1910-17.

Year ending—	
June 30th, 1905	$114,236
March 31st, 1910	102,608
March 31st, 1911	91,038
March 31st, 1912	100,659
March 31st, 1913	155,163
March 31st, 1914	153,880
March 31st, 1915	130,876
March 31st, 1916	163,335
March 31st, 1917	287,257

The Coal and Coke Tar.—"Coal-mine owners pay the Provincial Treasury a royalty of 10 cents per ton on all coal produced, except on coal shipped to coke-ovens in the Province. Owners of coke-ovens pay a tax of 10 cents per ton upon all coke produced. Several years ago the rate upon coke was 15 cents. The equal rate per ton on coal and coke is defended by coalmen on the ground that the difference in the quality of the coal used for coking purposes makes up the difference between the weight of a ton of coke, and the weight of the coal entering into it.

"The receipts from this tax, shown in Table XII., exhibit considerable variability. Less money was received from this source in 1917 than in 1910. The yield in 1913 was 50 per cent. larger than four years later, in 1917, but a part of this difference is explained by the change in rates.

Table XII.—Receipts from Coal and Coke Tax, 1905 and 1910-17.

Year ending—	
June 30th, 1905	$ 94,682
March 31st, 1910	222,722
March 31st, 1911	248,332
March 31st, 1912	195,207
March 31st, 1913	302,225
March 31st,1 914	192,590
March 31st, 1915	158,867
March 31st, 1916	173,261
March 31st, 1917	194,536

Tax on Unworked Crown-granted Mineral Claims.—"A special penalty of 25 cents per acre is imposed on mining property held by Crown grant and not

worked. The tax is of long standing and apparently provokes no opposition. In its nature it is similar to the tax on wild lands and on unworked coal land, and what has been said of the theory of these taxes applies here as well.

"The receipts from this tax, shown in Table XIV., are remarkably constant quantities, but are not important in size.

Table XIV.—Receipts from the Tax on Unworked Crown-granted Mineral Claims, 1905 and 1910-17.

June 30th, 1905	$39,869
March 31st, 1910	39,869
March 31st, 1911	42,020
March 31st, 1912	43,436
March 31st, 1913	42,733
March 31st, 1914	45,953
March 31st, 1915	40,296
March 31st, 1916	35,703
March 31st, 1917	37,903

That Prof. Haig is of the opinion that metalliferous mining is getting somewhat the worst of it under the present system is indicated by one of his concluding references to the situation generally with respect to mining taxation in this province. He says:

"To make comparisons it is necessary to reduce the elements to some common basis. Where a single tax is applied uniformly comparisons are readily made. But under the British Columbia tax law almost every interest is taxed upon a different basis and at a different rate. The assessment and tax data yield almost no information for drawing conclusions as to relative burdens. An inquirer who would know whether the coal-mining industry is heavily taxed as compared with the metal-mining industry must combine the various miscellaneous charges resting on each, and compare them with data regarding the economic strength of the industries gathered from some other source than the tax records. But it is difficult to escape the conclusion that coal-mines taxed merely on the royalty basis are equitably treated as compared with metalliferous mines, which, in addition to royalties, pay taxes on income and dividends. And it is not easy to see the equity in increasing 50 per cent. the taxes on Crown-granted timber lands when the charges are not increased upon timber companies drawing their supply from other sources than Crown-granted lands."

BEAVER CONSOLIDATED MINES.

At the annual meeting of the Beaver Consolidated Mines Company, held in Toronto, April 16, at which there was a fair representation of shareholders, it was announced by the President, Mr. F. L. Culver, who presided, that the Kirkland Lake mill, which is now in operation, will exceed its capacity of 150 tons. The underground work is progressinb favorably, and rich ore is being encountered at the 700 ft. level. On the Beaver property, development work has ben renewed at 1,400 feet. A new vein has been struck, that looks very promising. The directors of the Beaver Consolidated has just this week returned from the north, and were in a position to report first hand knowledge of the work on the company's joint properties, the Kirkland Lake gold mines and the Beaver silver mines.

A new director was appointed to take the place of Mr. J. H. Black, who has resigned, in the person of Mr. F. B. Mercer. The shareholders also passed a vote of thanks to the directors for the manner in which they have looked after the affairs of the company in the past year.

FAVORABLE DEVELOPMENTS AT NIPISSING MINES.

In his regular monthly report, manager Hugh Park, in reporting to the president and directors of the Nipissing Mining Company, says:—

During the month of March the company mined ore of an estimated net value of $261,158, and shipped bullion from Nipissing and custom ores of an estimated net value of $814,952. Favorable underground developments were met with at several shafts and general operations everywhere continued satisfactory. At shaft 73 drifting is progressing on vein 544. The depth of this new level is 548 feet below the collar of the main shaft. No high assays have been found to date, but the vein is strong and well defined, except where disturbed by numerous faults.

Particularly favorable developments are taking place at 96 tunnel. The new veins are being developed, one by winze and one by drifting. The vein being drifted on is one two inches wide and has been assaying several thousand ounces. Fifty feet of drifting has been done to date and the face of the drift shows two inches of high grade solid ore. Two small mud seams with fai rassays in the country rock, have lately been found at the 120-foot level of shaft 128. This is the new shaft recently completed and which will explore the western area of R. L. 401 at the north end of the lake.

The high grade ore treated amounted to 208 tons. The refinery shipped 55,108 pounds of bullion which contained 802,698 fine ounces. The low grade mill treated 6,962 tons. The following is an estimate for the month of March:—

Low grade mill	$162,946
Washing Plant	98,212
Total	$261,158

DOME HAS THREE NEW DIRECTORS.

It is the intention of the management of the Dome Mines, Limited, to have the mill running on a moderate scale in the latter part of April. From then on mill operations will be rapidly built up to a 600-ton daily basis. Such is the announcement, following the meeting of the directors in New York this week, made by a Toronto director, who was present.

It is believed that the annual financial statement of the company, which is being prepared, will show a surplus of current assets over current liabilities amounting to $489,000. It is stated also that the Dome Mines, which took an option on the Dome Extension property some time ago, is developing the mine from the sixth level, from which a cross-cut has been driven into the Extension property, where an ore zone was entered showing an average grade of $4 to the ton.

Three new directors were added to the board — namely, Mr. Colgate Hoyt, New York; T. R. Finucane, Rochester, and C. D. Keading, Porcupine. It is understood that the Board of Directors will be increased to nine members, and that Mr. Pouillon, of New York, will be the ninth member.

Wright-Hargreaves.

The construction of the mill, beginning with extensive excavations, will be in full swing at the Wright-Hargreaves mines by May 1st. The mill is designed to treat at least 200 tons daily, and will be the largest so far installed in the Kirkland Lake field.

THE ROAD TO KIRKLAND LAKE.

Interests representing some of the leading mines of the Kirkland Lake district are presenting evidence to the Ontario Government, showing the advantages and disadvantages of a steam railway, the disadvantages of an electric railway, as well as the advantages and disadvantages of a first class motor road. It will perhaps be a surprise to many to learn that these leading interests are not in favor of a steam railway, but appear to believe a first class motor road would best fill the requirements of the district.

A summary of the situation, viewed from various angles, is given herewith. It represents the opinion of a leading operator in the Kirkland Lake field, and is being submitted to those most vitally interested, asking for expressions of opinion. The summary follows:

As you are probably aware the Government has authorized the construction of a branch line of the T. & N. O. Railway from Swastika to Kirkland Lake at an estimated cost of $155,000, the route selected being that through the Elliott-Kirkland, across the narrows of Kirkland Lake to a point near the Wright-Hargreaves office and thence across the Sylvanite towards the Tough-Oakes mill.

As you are no doubt much interested in this important question of transportation and after consultation with a number of men who have considered the question in all its bearings, I venture to submit some facts, figures and estimates which I have collected, as the result of enquiries on the spot, and from data supplied by Mr. Clement, the Chief Engineer, and Mr. A. A. Cole of the T. & N. O. Railway with a view to asking you to give an immediate expression of your opinion upon the question as to how the needs of the community can best be met in this matter of transportation.

There were originally three obvious solutions for consideration, viz:—

1. A trolley road, which would appear to meet practically all requirements and give a fairly frequent and flexible service.

This has been ruled out on the score of cost, the estimated capital outlay involved being approximately $266,000, with the necessary transformer sub-station and equipment.

2. A steam railroad as outlined above, which has now been authorized.
3. A first class motor road capable of withstanding heavy motor trucks, and costing about $72,000, which does not appear to have received much consideration.

You are now asked to consider the relative merits and disadvantages of the steam railroad and motor road.

Steam Road Advantages are that it will:

1. Enable freight, including heavy machinery, and passengers to be brought to the mines cheaply, irrespective of weather conditions.
2. Provide for unlimited expansion of traffic in the future.
3. Cut freight rates from Swastika to any point up to Tough-Oakes in all probability to .40c per ton on coal, with proportionately higher rates on other stores and supplies, with an average all round rate of about .60c per ton.
4. Cut passenger fares probably to .25c each way.

The Disadvantages are that it will:—

1. Not enable freight to be delivered direct to the stores or bunkers on more than perhaps one or two properties, and therefore in most cases roads will be required from the railway stations of which there will be but two (one near the Elliott and one on the Wright-Hargreaves at the east end of the lake) to each mine and the townsite and practically all freight will have to be loaded on to wagons and teamed over these roads which have yet to be made, in order to reach its destination at an average estimated cost of .40c per ton at least, thus making the actual average cost of freight $1.00 per ton.
2. Passengers will in nearly all cases have to walk or obtain other means of transportation from the Stations to their destinations—distances varying from a few hundred yards to three-quarters of a mile or more.
3. The present wagon road will fall into almost complete disuse excepting isolated sections which will still be required, and it is unlikely that anyone will be inclined to make and keep in repair.
4. The service will be limited to one train per day each way, probably giving very little time for people to come in, transact business, or look for work, and get out on the same day.
5. The train service will necessarily be slow, with the stops for picking up freight, etc.
6. Consignees will require to have representatives present on the arrival of trains to take delivery or pay for their freight just as they do now at Swastika.
7. The estimated cost of operating and maintaining the branch, aside from interest on capital, amortization or depreciation, is $100 per day which would require say 130 tons @ .60c and 88 passengers @ .25c per day to break even. The average freight handled at present is 36 tons and the average number of passengers about 40 per day, so that it is clear the Railway would operate at a heavy loss amounting to over $20,000 per annum which must ultimately come out of taxes.
8. The right-of-way covers a considerable area of the claim over which it passes and tends to cut such claims in two with its bank or cutting and fences.

Motor Road. Advantages are that it will:—

1. Enable existing road freights to be reduced by means of motor trucks to about $1.00 per ton for the full distance to the Tough-Oakes with proportionately lower rates for the shorter hauls, this being as low as the total cost of delivery with the steam road.
2. Enable passengers to be handled for about .5c per mile in motor busses or less than the steam road could charge.
3. Provide a flexible system of transportation at all necessary hours, delivering freight and passengers to or from their destinations on the various mines or the townsite.
4. Enable individuals to walk, bus or cycle to any point along the field at all times of the day or night, thus permitting men to have fixed homes while moving their place of employment as they require.
5. Permit branch roads to start off at any point to outlying properties instead of only from the two stations on the steam road.
6. Save more than half the first cost of the steam road while providing ample facilities for the present time and the immediate future.

Disadvantages of the motor road are:—

1. In winter snow would have to be ploughed off or the vehicles run on the snow as in most cities in winter.
2. Heavy cost ($12,000 per mile) in order to make a thoroughly permanent water-laid or tar-macadam road.
3. Difficulty in getting a railway built in additon to the road later on unless a further great expansion takes place.

There is every probability that the matter will be settled definitely by the Government within ten days from date and meanwhile if it is considered by those interested in the Kirkland Lake field that a motor road would serve the purpose best **provided.**

(a) That the Government authorized the work immediately under proper supervision and if possible agreed to maintain the road for say ten years — at a cost not exceeding the estimated cost of maintaining a railway road bed, and

(b) That the mines would allow all available waste rock on their dumps to be taken for the work free of cost there is good reason to believe that the Government would readily adopt the latter plan.

Will you, therefore, please answer the following questions:

1. Are you in favor of a steam railway?
2. Are you in favor of a first class motor road, more or less on the line of the old road with modified and improved gradients?
3. If you have any waste rock dumped are you willing to allow it to be used for the road free of charge?

Special Correspondence

Silver Situation Unchanged.

The silver situation remains unchanged with apparently continued heavy demand. Recent predictions by metal authorities in New York that price restrictions might be removed about May 1st, and the price of silver be permitted to find its level on a basis of supply and demand seems to be exceedingly indefinite. Indeed there are various reasons for believing such action will not be taken. In the meantime the mines of Cobalt are experiencing prosperity and, although the removal of price restrictions would be favored locally, and would probably result in quotations moving to higher levels, yet the general feeling appears to be that the matter is an Empire question and one that should be regulated by those at the helm of state, particularly during the present period of reconstruction.

Lightning River.

Interests involved in property in the Lightning River district are appealing to the government for assistance in the building of a road to the centre of activity. For the present $3,000 is being asked, which would be adequate until such time as the merits of the district are further proven.

Kirkland Lake.

Operations are being speeded up in all parts of the Kirkland Lake field. Following the announcement recently that the Ontario Government would construct a branch line of the T. & N. O. Ry. from Swastika to the centre of activity in the Kirkland Lake field, a distance of about six or seven miles, some of the leading mining interests have presented evidence to the government with a view to discouraging the construction of a steam road and building a first class motor road instead. The cost of a first class motor road would be about one-half that of the steam railway, and would provide a flexible system of transportation, making travel possible at any hour of the day or night and would land passenger or freight directly at their or its desination. Compared with this, the steam railway would land passengers at stations and make necessary walks or hauls of from a few hundred yards to three-quarters of a mile or more to the various mines. The full evidence is given in another column, and appears to be very reasonable and overwhelmingly in support of a first class motor road, the cost of which would be $72,000.

Mine Workers Object to Governments Choice of Commissioners.

District 18, United Mine Workers of America, which comprises Eastern British Columbia and the Province of Alberta, is keenly interested in the announcement by Hon. G. D. Robertson, Minister of Labor, that the Industrial Commission, recently appointed to investigate the relationship between Capital and Labor in the Dominion of Canada in order that action may be taken to place it on a basis of better understanding than now exists, will take up the question of the labor situation in the mines of this province at the commence of its duties. The appointment of T. Moore, president of the Trades and Labor Congress, and J. W. Bruce, to the Commission as the representatives of Labor, however, is bitterly opposed by the coal miners. Telegrams have been forwarded from Fernie, B. C., to the Minister of Labor and to Dr. Bonnell, the member of Parliament for the District demanding that these appointments be reconsidered.

"One Big Union" Not Popular.

It will be remembered that at a recent Labor Convention held at Calgary, Alberta, approval was expressed of a proposal that Canadian workmen should organize "One Big Canadian Union," as it has been popularly termed, and withdraw from affiliation with American organizations. The idea, however, is not meeting with unanimous endorsation, however, as is evidenced by the observations of David Rees, international organizer of the United Mines Workers of America. Mr. Rees, who is a coal miner and in close touch with the coal miners' unions of British Columbia and Alberta, and who has been engaged in organization work for some years, says, in part:

"There is no doubt in my mind that the Western Conference held at Calgary should have done the thing that the Conference was called together for, that is: Outline a more progressive policy for the Trades and Labor Congress of Canada. We find that in centres like Toronto, Montreal and other parts of the East the labor people are clamoring for a change. Consequently had the Western Congress outlined their policy we would have hoped to have the Eastern Labor

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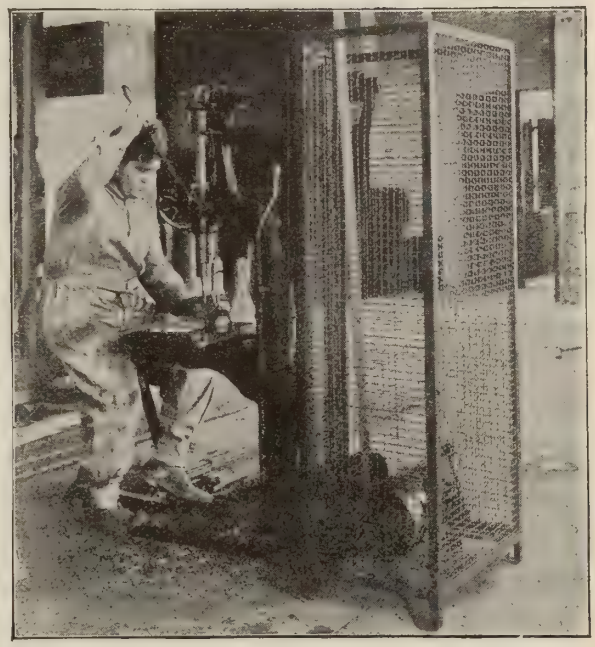

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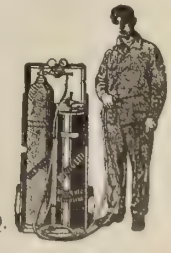

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Dolly Varden.

The Provincial Government has nominated Mr. Justice Clement, of the Supreme Court, to act as referee in connection with the dispute between the Dolly Varden Mines Company and the Taylor Engineering Corporation, the points of which were the subject of investigation during the recent session of the Legislature. Judge Clements will go into the whole question of the financial obligations of both concerns and assess costs, etc., in accordance with the terms of the settlement decided upon by the Provincial House.

Title to Coal Lands.

Another phase of the dispute as to the title to coal rights within what is known as the Esquimault and Nanaimo Ry. Belt on Vancouver Island has developed. Does the ownership of coal lying under School, Indian, Naval and other reserves, which were created by the province prior to the grant of the so-called belt to the railway company, lie in the province or the company? It is contended that these coal rights did not pass to the company, although, of course, the latter maintain that they, along with all under-surface rights not specifically mentioned in the Settlement Act, became the property of the railway company under the terms of the said Act. The issue has been before the courts which, in one instance, have upheld the contention of the company. There is considerable valuable coal property at stake in this argument and the province proposes to make an investigation of the matter with a view to the passage of legislation, if it should be found justified, declaring the affected areas to be reserves, thus removing them from the control of the railway company.

The Smelter Rates Enquiry.

From an unofficial but authoritative source it is learned that the Committee of Investigation, engaged on the question of custom charges made by the Consolidated Mining & Smelting Company at its Trail Smeltery, has received very little information or serious formal complaint from shippers of ore to Trail. The Committee, however, has proceeded with its work of investigation at the smelter and has acquired a large amount of definite practical data and has so far digested the material as to justify the engagement of the services of R. O. Whitaker, of Denver, Colo., and an accountant to assist him. With this aid the preparation of the committee's report will be carried on with all possible despatch.

Gold Strike on Morley River.

A gold strike which is attracting much attention is reported on the Morley River, about 150 miles to the northeast of the town of the Skagway and just a few miles south of the international boundary. Morley River runs into Teslin Lake. The surface dirt is said to pay from 30 to 50 cents. Bed rock has not yet been struck. It is expected that there will be a rush to the new diggings with the opening of the summer season.

BRITISH COLUMBIA.

A Road for Aspen Grove.

A road between the town of Princton and the Aspen Grove Mining Camp is to be opened by the Provincial Government this season. It is known as the One Mile Road, and will shorten the distance between the towns of Princeton and Merritt by about 17 miles. Besides it will be of special value to the mining camp named and other similar centres.

Abandoned Claims.

The Mining Committee of the Provincial Legislature during the last session discussed the advisability of recommending the cancellation of all Crown Granted Mineral Claims which have reverted to the Crown through non-payment of taxes. The argument of those favoring the proposal was that by the cancellation of their claims, and the consequent eradication of the surveys from the records, the lands involved would become open for pre-emption by the settler. It was stated that land seekers often found it impossible to make up an even block of suitable agricultural land because of the existence of deserted Crown granted mineral claims. While these contentions were given every consideration, it was felt that no hasty action should be taken, more especially as these old Crown granted mineral lands have made substantial contributions of the public treasury, and, under the existing law, are open to the prospector who may feel that their possibilities have not been properly tested, on exceptionally easy terms.

The Peace River Oilfields.

There is no doubt that the Provincial Government's announcement that it proposes prespecting the oil deposits receives the endorsement of the people of this Province, and already there is speculation as to which district it is intended first exploring. As stated before in this correspondence the Peace River Section is generally thought to be the most promising. This is based on the drilling which has been in progress in Northern Alberta for the past ten years, and the results of the same. Within a short distance, comparatively, from the Peace River Country there are a number of small wells from which a certain amount of petroleum may be taken by pumping. Hon. T. D. Pattullo, Minister of Lands, made reference to one of these in addressing the Legislature. That to which he had reference is said to have a productive capacity of 200 barrels per day of a heavy black oil. The same country was drilled by Lord Rhondda, who obtained favorable indications, but found difficulty with salt water under great pressure, preventing drilling to depth. His representatives were strongly of the opinion that below the point reached the prospects would improve. Mr. Charles Camsell, of the Geological Survey Branch, with headquarters at Vancouver, B.C., has for some years expressed the opinion that the Mackenzie River basin would prove one of the world's greatest oilfields, there being 350,000 square miles of geological formations favorable to petroleum. The difficulty in connection with the development of the natural resources of this far northern country is lack of transportation in the winter. In the summer the great rivers are navigable, thus rendering the problem of ingress and egress less formidable.

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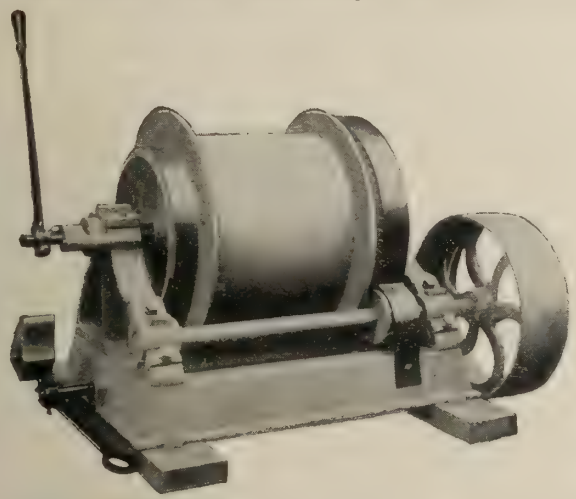

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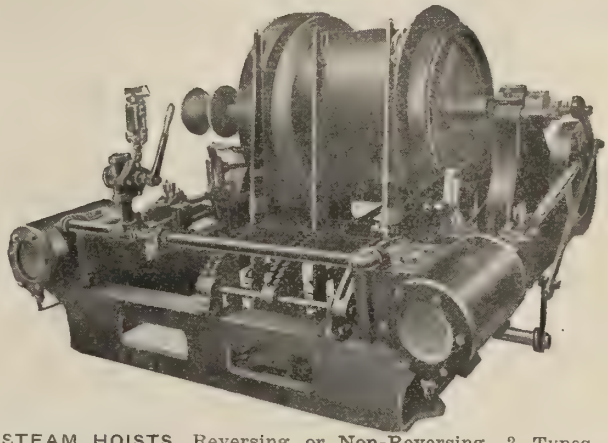

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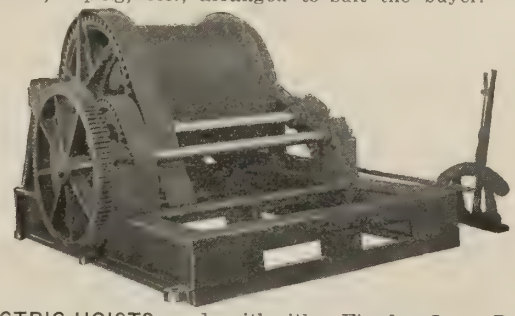

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Lucky Cross.

The Lucky Cross Mining Company has been reorganized, the new company to be known as the Marigold Mining Company, and work to be resumed this spring.

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Information on this subject can be obtained by writing:—

The Industrial and Resources Department Canadian National Railways
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EDITORIAL

THE PRICE OF SILVER.

Mining Interests in the Cobalt silver district are are evincing a good deal of interest in the activities of the so-called "Silver League", in the United States. Should the efforts of the League be successful, and result in the removal of the fixed maximum price of silver, or perhaps an increase from 101.½ cents to $1.25 cents an ounce, the development would be of extreme importance to the silver mines of this country. Not only would it result in greater earnings on present ore, but should serve to add tonnage, in that a large amount of low grade material not classified as commercial ore with silver at the current quotations, could be profitably treated following an increase in price.

INCREASED ACTIVITY IN GOLD MINING.

There is every indication that the increase in activity in gold mining is to result in very important developments this year. In some lines of industry there are so many difficulties to be overcome that the return to normal conditions is being very slowly made. In the case of gold mining we will not have a return to pre-war conditions, but rather an expansion that will make pre-war operations look small. Porcupine and Kirkland Lake areas will soon be producing on a larger scale and the less developed gold areas will also receive attention.

MINING.

Treatment of Silver Ore at Nipissing Mine.

In his report on operations during the past year, general manager R. B. Watson says of the results obtained by the allcyanide process:

"The process which has heretofore been used in the treatment of our high grade ores and which gave satisfactory results for seven years, is an amalgamation process, using a large quantity of mercury. The price of mercury before the war was $33.00 to $39.00 per flask of 75 lbs. Demand for war purposes raised the price to $130.00 per flask. This so increased the cost of the process that it was decided to discontinue amalgamation and rely on cyaniding alone, after giving the ore a preliminary treatment with bleaching powder in the tube mill.

"The necessary apparatus for this process was installed in the low grade mill at a small cost, and in August last the old high grade mill was shut down. The new process is working smoothly and will be used as long as it shows a saving over amalgamation."

In the low grade mill there was treated during 1918 80.274 tons ore containing 1.911.198 oz. silver and 43 tons by-products containing 116.066 oz. silver. There was recovered 1.796,923 oz. silver or 87.95 per cent. The average tailing contained 2.82 oz. silver per ton.

In February 1918, thirteen roughing tables were installed over the tube mills, and in April, sixteen fine sand tables were added.

"The ore is crushed by stamps in cyanide solution and goes to the roughing tables without classification. The tailing is classified; the sand is recrushed in tube mills; the overflow from the classifier goes to the fine sand tables. The tube mill discharge is returned to the classifier; the tailing from the fine sand tables is cyanided.

"By this method 48% of the silver in the ore is recovered in the form of concentrate, 40% as precipitate from the cyanide plant, and 12% goes to waste.

"The concentrate is re-treated with the high grade ore in the high grade mill and the precipitate from both treatments is sent to the refinery where it is converted into bullion.

"This process gives a better extraction and at less cost than can be obtained by cyanide alone on the quality of ore now being produced; due consideration must be given for the value of the cobalt in the concentrate.

"Forty stamps ran 323 days, or 88.49% of the possible dunning time; they crushed 248 tons per day or 6.98 tons per stamp per day."

DEVELOP CLAIMS OR FORFEIT THEM.

In connection with the problem of finding a remedy for the existing laws which permit large areas of territory to become staked out and held in idleness, the suggestion that all claim holders should have to perform perpetual assessment work or pay its equivalent in taxation, has apparently met with no concrete opposition, and has found considerable favor in the eyes of not a few prospectors.

Genuine prospectors look upon the frequent amendments to the Mining Act of Ontario as the very reason for the Act being perhaps the most satisfactory ever compiled. The genuine prospector is as far from being a "land grabber" as a racehorse is from being a donkey. As for the frequency of amendments to the Mining Act, the present day prospectors have to thank the untiring and sincere effort of far-sighted men for these very amendments which are serving to keep the mining laws up to date. In order to keep such laws from becoming obsolete it is necessary to continually add desireable amendments. Very recently the prospectors received the benefit of an amendment which permits the cost of survey to apply as so much assessment work done.

The properties like the Nipissing, Miller, Lake-O'Brien, Dome, Hollinger, Tough-Oakes and dozens of others, were developed into important mines, not through being held in idleness, but through the unremitting efforts of their owners. These properties, without exception, were worked almost continually without such work the prospectors and the country would not be reaping the present great advantages which have accompanied the successful development of such mines.

If assessment work were to be perpetuated on mining claims, and before such an amendment should be made, it is unquestionably true that "land grabbing" on the

part of so-called settlers should also be remedied. Truly, it would not be just to single out any one set of individuals as being responsible for the present conditions, but the fact remains that large areas are being held in idleness by reason of patent having been secured on mining claims and the only apparent remedy lies in perpetuating assessment work or imposing its equivalent in taxation. Such would not mean that annual trips to mining claims would be necessary, in that work could be done as far in advance as desired, but it would mean that the game of watchful waiting would cease.

The writer has spent a good deal of time in the majority of the mining camps in Canada, the time, for the greater part, being spent in the capacity of a prospector. In each case, that old adage "when in Rome do as the Romans do," has been adhered to. This has been particularly true in Northern Ontario, where the mining laws appear to be better than any others in the world, and where any prospector should be pleased to apply his efforts, and where we have the advantage of a Bureau of Mines that at all times is endeavoring to add to the efficiency of the mining laws.

The Journal solicits expressions of opinion from mining men and prospectors with regard to the advisability of supporting a plan to perpetuate work on mining claims, believing that such would prove beneficial to the genuine prospector. A wholesome discussion of the subject should be beneficial.

The suggestion appears to have already won a good deal of favor, not only among the prospecting fraternity, but with the Mining Commissioner for Ontario, as well as among members of the Canadian Mining Institute.—J. A. McR.

Western coal operators are asking for an independent board to take control of the coal industry in the West. This would indicate approval of the work of Mr. Armstrong who, during the war has been Director of Coal Operations in District 18.

The discontinuation of British Government purchases of ores of molybdenum and tungsten has evidently been caused by the over supply on the market. This will be unwelcome news to those who opened molybdenite mines during the war.

The conferring of the honorary degree of LL.D. on Emeritus Professor William Nicol was a well merited distinction. Professor Nicol has been for nearly thirty years a teacher at Queen's University and an enthusiastic one. He has to his credit a large share of the success of the School of Mining, where he trained many a student in the use of powers of observation. He had a passionate love for the school and its work, and did everything in his power to make it efficient. As a teacher of mineralogy, he endeavored to obtain for each student a collection of representative minerals, for he is a strong believer in the objective method, which has recently been championed by Mr. Corless. He took such a personal interest in all his students that there is peculiar satisfaction to them in learning that "Billy" Nicol has been honored by his university.

According to reports of hearings before the Industrial Relations Commission in Calgary last week the operators present did not favor the appointment of a joint council of employers and employees because most of the miners are foreigners whose ignorance made them a prey to agitators. It is unfortunately true that in most mining districts there is a large proportion of foreigners, most of whom cannot understand the English language, and that these men are commonly used as tools, by agitators. But should we not endeavor to do something to remedy this condition of affairs? Can we make progress so long as the same old objections are accepted as insurmountable obstacles: If we are to continue to use foreigners, should we not attempt to make good intelligent citizens of them? What is being done in the mining communities to counteract the propaganda of professional disturbers?

COMPARATIVE COST OF MATERIALS.

In the report of Mr. D'Arcy Weatherbee, of the Mining Corporation of Canada there is published the following comparative summary of material costs. It will be seen that practically every item increased in 1918 over 1917. Since the Armistice, however, a tendency to lower prices is indicated and it is hoped that 1919 will show a general reduction.

	Dec. 1913	Dec. 1915	Dec. 1916	Dec. 1917	Dec. 1918
40% Forcite ..... Price per 100 lbs.	$12.98	$12.98	$20.58	$24.75	$24.75
60% " ..... " " " "	15.98	15.98	25.58	31.75	31.75
No. 8 Detonators ..... Price per 100	1.19	1.72	2.70	2.70	2.70
Fuse ..... Price per case (6,000 ft.)	23.85–24.35	26.60	28.60	33.20	43.80
Mine Rails ..... Price per ton	43.50–45.00	48.00	52.00	100.up	100.up
Steel Sheets 3-16 ..... Price per 100 lbs.	2.90	2.75	5.43	10.00	12.00
" " 1/8 ..... " " " "	3.00–3.20	2.90	6.00	7.25	12.00
Bar Iron, Base ..... " " " "	2.50	2.50	3.80	5.00	5.25
Solid drill steel ..... " " " "	8.00–8.50	7.88	10.50	14.00	16.00
Hollow drill steel ..... " " " "	.....	12.00	12.00 and 14.00	23.50	25.50
Nails, Base ..... " " " "	2.90	3.30	5.10	5.85	6.10
Fuel Oil ..... Price per gal.	.....	.08½	.11	.13½	.14
Drill Oil ..... " " "	.24–.26½	.22	.25	.28	.26
Waste ..... Price per lb.	.08½–.09	.08¾	.15	.16½	.14¾
Steam Coal ..... Price per ton	5.75–5.87	5.75	6.20–9.80	9.70	10.15
Pipe 1" ..... Price per 100 ft.	5.41	5.44	9.98	14.00	14.79
" 2" ..... " " "	11.78	11.90	20.12	30.48	32.12
" 3" ..... " " "	24.71	24.72	44.89	63.86	67.34

MINING CORPORATION.

In the report on exploration of new properties Mr. D'Arcy Wetherbe, consulting engineer of the Mining Corporation of Canada says in part:

Efforts were continued in 1918 to secure a suitable property for exploitation, but, although out of many investigated several have distinct merit, only one has been acquired. In Canada and the United States 160 proposals were considered against 90 in 1917, and a large number of these were examined by your engineers. In the Cobalt district, four properties were examined and extensive work was done on three of them. All were rejected, however, as no ore bodies were proved. At North Cobalt a property is now being actively prospected, though nothing of value has as yet been found.

In the Casey district, the Mining Corporation, working under option, is developing the "Nels Nelson" and other claims, where, in 1914, a shaft was sunk on a vein to a depth of 40 feet, but has since lain idle. This shaft, known as No. 5, has been equipped with head frame, hoist and pumps, and the necessary buildings. It is to be sunk to the Keewatin contact, which several diamond drill holes have shown to lie, in this neighborhood, at an approximate depth of 350 feet. Cross-cuts will be driven from this shaft, both at the 220 foot level and from a level near the contact, northeasterly and southerly, closely following the plan suggested by the writer in 1914, of which details were at that time issued to the shareholders of the Casey Cobalt Silver Mining Company. This shaft, at the close of 1918, has reached a depth of 280 feet.

Of the other prospects in Northern Ontario, the "Rickard," on preliminary examination, showed rich gold ore near the surface, but after a campaign of drilling and underground work, occupying over six months, very discouraging results forced its abandonment.

Near Madoc, in Eastern Ontario, a vein of fluorspar was examined and finally acquired and a separate Company controlled by your Corporation was formed for its exploitation. A plant has been installed and a power line built to the property by the Ontario Hydro Electric Comission. Development work has reached a depth of 200 feet, and a body of ore of good quality has been partially exposed. Shipments of this ore have been made to several buyers under contract, and are expected to be resumed shortly. Depending on the future market condition, and on the results of further development of the ore body, the venture seems promising.

In British Columbia, and at other places in Western Canada, several properties, examined or considered, were all decided to be unsuitable for acquisition, and the options were given up.

Shareholders will have heard of the tragic news of the visit to Alaska, to examine the "Engineer" gold mines, by your Resident Manager, Mr. C. E. Watson, and his assistant, Mr. Randolph, during which both these gentlemen, as well as one of the chief owners of the property, lost their lives under most distressing circumstances, in the sinking of the steamer Princess Sophia. No report on the examination was received and no further action has, under the circumstances, been taken.

NIPISSING'S SEARCH FOR NEW PROPERTIES.

In the report of the Nipissing Mining Company for the past year, general manager R. B. Watson, says:

A diligent search was made to acquire another mine for Nipissing; over a hundred different properties were examined either personally or by reports — mines situated in Canada, Arizona, California, Idaho, Missouri, Montana and Nevada.

Most of the work was done in Ontario where we had a scout in the field throughout the year. Fifty-three separate groups in fifteen townships in Ontario and Quebec were personally examined. The work done in the United States was in charge of another engineer.

Only two of these properties were taken over and operated and in neither case were the developments satisfactory. At Fort Matachewan on the Montreal River considerable surface work was done on a gold property, but the results did not justify its purchase.

At Butte, Montana, an interest was acquired in the Butte Copper Czar Mine by buying treasury stock, the proceeds of which were spent under our direction. The development was disappointing and the mine was closed down.

Search for new properties will be continued during the coming year.

COST OF PRODUCING SILVER AT NIPISSING MINE.

Based on production of 3,701,416 ounces silver.

		Per Ton Ore	Per oz. Silver Cents
Exploration	$ 108,227.	$ 1,329	2.92
Diamond Drilling	20,045.	.246	.54
Development	73,023	.897	1.97
Stoping	104,380.	1,282	2.82
Hauling Dumps	6.706.	.082	.18
Shipping Residue and Cobalt Ore	3,369.	.041	.09
Assaying and Engineering	9,968.	.122	.27
Administration and office	42,702.	.525	1.15
Camp Maintenance	9,091.	.112	.25
Insurance and Taxes	383,716.	4.713	10.37
General and Legal	12,923.	.159	.35
High Grade Mills	144,749.	1,778	3.91
Low Grade Mill	410,014.	5.037	11.08
Depreciation on Plant.	59,004.	.725	1.59
Marketing Product.	67,249.	.826	1.82
Corporation, N. Y. Office, and Travelling	20,660.	.254	.56
	$1,475,832.	$18.128	39.87
Less Rents,, Profit on Supplies Sold, Discount and Exchange at Cobalt.	31,481.	.387	.85
Total Cost of Production	$1,444,350.	$17.741	39.02

Merritt Collieries.

The Merritt Collieries Ltd. are opening up a new No. 3 slope. It is in the Diamond Vale field and when completed is expected to result in a material increase in the coal production of that section.

THE BRITISH COLUMBIA DEPARTMENT OF INDUSTRIES.

The mining industry of British Columbia is expected to be materially benefited by the Industrial Act which passed the last session of the Provincial Legislature. A deputation of returned soldiers made representation that action along these lines should be taken for the purpose, generally, of promoting industry and the development of the natural resources of the country. For this work an industrial Commissioner must be apopinted and this official and his assistants must have funds. The latter necessity has been foreseen by the granting of authority by the Legislature for the raising of the moneys required up to a certain set maximum. Mining men, as has been stated, are looking to see this move help them and the industry in which they are interested. They belive that, as British Columbia probably is more a mineral bearing area than anything else, those concerned with mining must receive the most assistance.

Following are the powers of the Department of Industries set out in seriatim form:

The powers of the Department of industries shall be:

(a) To provide for industrial research; to co-ordinate as far as possible all industrial investigation and research; and to collect and disseminate data emanating therefrom.

(b) To acquire and utilize in arts and manufactures the knowledge already existent in other countries.

(c) To carry out an economic survey of the natural resources of the province, and to furnish advice in regard to the best methods of utilizing such resources.

(d) To furnish advice with regard to the best methods for attacking industrial problems, for inducing industrial improvements, and for facilitating and encouraging manufacture in suitable localities;

(e) To co-ordinate various industries so as to obtain the best combined results and the exchange between user and manufacturer of manufacturing improvements and operating experience, and to bring together producer, manufacturer, and purchaser.

(f) To publish technical, scientific and statistical information, and to encourage technical and industrial study by all possible means;

(g) To enquire and report on and aid in the establishment of any industries in British Columbia where it appears that such industries can profitably be carried on.

(h) To consider and initiate scientific researches in connection with or for the promotion of primary or secondary industries in the province;

(i) To aid by loan, guarant or guarantee of securities on approved plans any enterprise calculated to encourage the economic and commercial manufacture of the natural resources or products of the province;

(j) To consider and deal with plans submitted by representative bodies of returned soldiers of British Columbia for promoting and providing for employment through the establishment of new industries and the development of existing industries;

(k) Generally for any other purpose calculated to promote the economic development of the province.

Oil Company Wants Concession in Peace River District.

The D'Arcy Exploration Company, which is the exploration agent of the Anglo-Persian Oil Company, is interested in the oil bearing possibilities of certain sections of British Columbia. A representative of the former concern has approached the Provincial Government seeking such concessions as would wararnt the investment of the capital required to thoroughly prospect the areas which are considered promising. The company's chief request is to be given control over a tract of land 60 miles square in the Peace River District immediately south of the block of land owned by the Dominion Government and lying directly west of the inter-provincial boundary. Two years are asked for to carry out necessary geological examination and three years more for drilling and other preliminary work. In return the company proposes that the Province shall receive one-eigth, or 12½ per cent. at the casing mouth of all oil discovered and produced.

Mr. C. F. Law, who is acting for the Company in its negotiations with the Government, points out that the tract of land asked for would be only about one-tenth of the vast Peace River Territory. Probably not more than one-tenth of the lands covered by a concession would be actually used in producing oil, as, of course, the land actually needed in producing oil is a small proportion of what must be explored. The company, Mr. Law explains, seeks sole exploration rights within the area named. It is not willing to go in under the existing regulations, which would give it prospecting rights only. Thus, after the expenditure of much capital, it might find itself in the position of discovering oil on property not under its control. It has consented to pay 12½ per cent. royalty to the Government for the reason that a larger concession is being asked than is provided for under the existing laws. Provincial Statutes, it may be explained provide that oil producing companies shall pay a royalty of 2½ per cent. per barrel. Mr. Law wants the Government to act without delay. He states that to wait to place the matter before the Legislature at its next session would mean the waste of a year in exploration. He believes that oil will be discovered in quantity and hopes that the company will be permitted to proceed with its plans immediately.

Granby By-product Coke Ovens to be Operated June 1.

The Granby Consolidated Mining & Smelting Co.'s smelter at Anyox, resumed operations on Friday, the 4th of April, having been idle since the 2nd of March. The mine also was re-opened. Men to take the places of those who left last month were obtained in Vancouver and elsewhere in the Province, those who received and accepted or rejected applications giving preference to returned soldiers. The latter, therefore, are largely represented at Anyox at the present time.

Mr. F. M. Sylvester, the managing directorf of the company, who arrived the other day from New York, has made the interesting announcement that the new by-product coking ovens at Anyox will be opened on or about June 1.

There was one fatality in the metal mines of British Columbia during the first quarter of the present year as compared to three in the same period, 1918. The death referred to was caused by a skip in the shaft of the Surf Inlet Mine.

CANADA'S PRODUCTION OF CHEMICALS DURING THE WAR.

Canada, in the line of chemical industry and production during the war, stepped from a very lowly plane to one of high accomplishment, according to Mr. Noble W. Pirrie, director explosives for the Imperial Munitions Board, in an address given before the British Columbia section of the Society of Chemical Industry recently.

Mr. Pirrie spoke on the subject of the Canadian chemical war industry. He stated that what had been done in the matter of shell, steel and airplane production was now common knowledge, there was general public ignorance of the production of chemical plants. The vast sum of $15,000,000 had been expended in erecting chemical plants during the war and these, he added, had produced $200,000,000 worth of explosives. The war was a war of scientists and the scientists of Canada had performed a great research work in doing their share.

Dealing largely with the subject of the production of acetone, an essential in high explosives and propellants, he told how when the demand became acute the research experts of Canada and the United States bent their efforts toward increasing that production. The older method of producing from alcohol was used in the United States at first. This while not commercially successful under ordinary conditions resulted in a good, though not sufficient, production. Other methods were sought. In the United States another process wherein kelp was used was also taken up.

In Canada two new processes were discovered and proved, he continued. The erection of the great plant at Shawinigan Falls, and that at Trenton, and the utilization of the Gooderham & Worts distillery followed. In connection with the use of the latter establishment, he told how the owners of the property refused an offered rental and gave freely the use of their plant during the war.

The Shawinigan Falls plant was developed to be the largest acetic acid plant in the world, producing finally 1,600 tons monthly. The Gooderham & Worts plant, when the United States entered the war, was producing over 2,000 tons of explosives per year.

During the six months ending Oct. 16th, 1918, when the Trenton plant was wrecked by an explosion, the combined Canadian production, exclusive of private companies, was 25 per cent. of the entire production of nitric acid in the British Empire, 10 per cent. of another essential chemical, and 36 per cent. of a third. During that time 16,000 tons of guncotton were produced in the Empire and of this 8,000 tons were from Canadian plants. These figures, Mr. Pirrie stated after his lecture, did not include the production of plants such as that on James Island, British Columbia.

Mr. J. A. Dawson, of the Dominion Government chemical department here acted as chairman of the meeting. In his introductory remarks he spoke of the importance of Canada ever endeavoring to improve its research departments and pointed out the splendid results already obtained by Canada. In this he mentioned the highly creditable services given by several British Columbia chemists in war-time research, speaking particularly of Professor McIntosh of Trail, who did work in zinc production at the British Columbia plant before he was taken to more important work at the great Shawinigan Falls establishment.

Mr. Pirrie in answer to a question relating to the commercial possibilities of T.N.T. declared that in his opinion it had come to stay. It had superceded picric acid, it did not freeze, and it could easily be used either as a quick or slow burning powder. As to its safety he said that not a single pound of T.N.T. had ever been exploded through fire. He told of a carload through which a huge plate of steel fell without causing an explosion. In Mr. Pirrie's opinion T.N.T. will eventually be freely accepted as freight by transportation companies.

A hearty vote of thanks was extended to the speaker of the evening. Mr. Dawson, at the conclusion of the lecture and discussion, suggested the importance of a chemical research bureau in British Columbia.

BRITISH COLUMBIA COAL PRODUCTION.

A distinct improvement is apparent in the coal production of British Columbia during the month of March in comparison with that of February, there being a difference of approximately 28,000 tons. The total for March is about 223,000 tons. The reason definite figures are not given is that returns have not been received from one or more of the smaller of the province's producing mines. In March the Crow's Nest Pass Collieries were working at least five days a week, which is better than was done in February. It may be observed incidentally, in connection with the Vancouver Island output, that the new Wakesiah Mine of the Canadian Western Fuel Company, which was expected to be in operation by this date, is still in the development stage, the work of opening up the property having ceased some weeks ago.

Following are the detailed figures:

Coal Production of Vancouver Island for March, 1919.

	Tons.
Canadian Western Fuel Co., Nanaimo	58,005
Canadian Collieries (D), Ltd., Cumberland	56,158
Canadian Collieries (D), Ltd., Extension	22,090
Canadian Collieries (D), Ltd., South Wellington	7,281
Pacific Coast Coal Mines, South Wellington	5,298
British Columbia Coal Co., East Wellington	2,788
Nanoose Collieries, Limited, Nanoose	1,898
Granby Consolidated M. S. & P. Co., Cassidy	945
Total Vancouver Island	154,463

Coal Production for Nicola-Princeton District, March, 1919.

	Tons.
Middlesboro Collieries, Ltd. Merritt	4,616
Fleming Coal Company, Merritt	3,955
Columbia Coal Company, Coalmont	480

Coal Production for Crow's Nest Pass District, March, 1919.

	Tons.
Crow's Nest Pass Collieries, Coal Ck	32,834
Crow's Nest Pass Collieries, Michel	20,405
Corbin Coal Company, Corbin, B.C.	4,126
Total for District	57,365

Concentrating Plant for Bowena Copper.

The Bowena Copper Mine, which is under lease to C. W. Tipping, is to have a concentrating plant, instructions having been given for its installation. A shaft has been sunk and values obtained which are considered very satisfactory.

Destruction of Mine Property by the Huns

Frank H. Probert, consulting engineer of the United States Bureau of Mines, and dean of the College of Mining, University of California, member of a special American Commission to investigate the damage done by the Germans during the war to the coal and iron mines and steel works of France and Belgium, after a personal investigation, has just returned to Washington with a first-hand story of the almost unbelievable atrocities of the Hun in the destruction and wreckage of the Industrial life of France and Belgium. Mr. Probert, together with Dr. F. G. Cottrell, chief metallurgist of the Bureau of Mines, and George S. Rice, the chief mining engineer, made up the American mission sent to Europe last January on the invitation of the French High Commission. The purpose of this mission was not only to investigate the damage done, but to advise with the foreign officials concerning reconstruction and rehabilitation and assist in any way possible on matters pertaining to the mineral industry.

Mr. Probert visited the iron mines of Nancy, Briey, Longwy, and Luxemburg; coal mines in the Province of Saar, and the coal district of Pas de Calais. Details of the investigation will be published in an official bulletin of the U. S. Bureau of Mines within the next three months, until which time, no detailed statement is permissible. Letters of introduction from M. Loucheur, Minister of Industrial Reconstruction in France, assured the mission proper recognition, and every facility to expedite the work was given by the French government officials. On instruction cabled by Secretary of War Baker to General Pershing, rapid transportation was arranged and such other assistance as needed was placed at the disposal of the representatives of the Bureau of Mines. In no other way would it have been possible in so short a time to get as comprehensive an insight into the present-day condition of the mining industry of the Western front.

Mr. Probert, in a preliminary report to Van. H. Manning Director of the Bureau of Mines, has the following to say:

"Early in the war the German hordes swept southward through the iron basin of French Alsace and Lorraine, and for nearly four years this renowned mining area was held and exploited by the invaders. Many of the employees were made captives and compelled to work in the mines under German direction. The international boundary between France and Germany was drawn in 1871 to give the victor of the Franco-Prussian war control of the iron fields, but since that time scientific development, guided by a better understanding of the local geology, exposed for France a greater ore reserve at lower horizons than that of Lorraine Annexee. With the return of Alsace and Lorraine to the mother land, France will become the dominant factor in the future steel industry of Europe. During the German occupation, the iron mines were not intensively exploited because of the necessity of recruiting into the Teuton army every able-bodied man and on account of the large accumulation of war minerals in preparation for the war. The actual physical damage to the iron mines is relatively small when compared with the destruction of the coal fields of northern France, which was as reprehensible as it was completed. Only in a few cases, where pillars have been robbed, is there any collapse of underground workings in the iron mines, but the equipment, both surface and underground, has been misused, and where ore has been mined, the lack of development will defer realization of capital until the exploratory work is sufficiently advanced to admit of daily output approximating pre-war conditions. The mines are not seriously crippled, but what of the steel plants in which the iron ores are smelted? No such atrocity was ever perpetrated against the industrial life of any country. Magnificent plants, comparing favorably with anything in the United States, are now but a tangled, twisted mass of structural steel and broken stone. The wilful demolition was scientifically planned and systematically carried out. This after the removal of all such mechanical and electrical power units as could be used in Germany. The maliciousness and efficiency with which this crime against French industry was conducted is almost unbelievable.

"In the coal districts of Pas de Calais and Nord, a sector fought over from the beginning to the end of the war, changing hands frequently, bombarded all the time, all surface structures whether of town, village or mining enterprise have been razed. This may be legitimate warfare, but now that the guns are silenced and the frenzy of combat is past, it is horrible to look upon. Arras, Douai, Bethune, Bapaume, Lens, Loos, Courriere, centers of coal-mining activity but a few years ago and the mainspring of French industrial life, are gone, but the indomitable spirit of France survives and already plans are laid for the future. Bruay, at the western edge of the known coal field, was not in the fighting zone and its output has been steadily maintained, but going eastward the frightfulness is more and more appalling, for the hate of the Hun left its mark on the mines during his forced retreat. The coal measures are overlain by water-bearing strata, necessitating special methods of shaft sinking and support to keep the mines dry. The steel lining of the shafts was dynamited, letting in the quick sands and flooding the underground workings for many miles. In the entire Pas de Calais region it is estimated that 120 million cubic meters of water must be pumped before mining operations are resumed. Having flooded the mines, the headframes and surface equipment were systematically dynamited, the twisted debris in many cases filling up the demolished shafts. It will probably be five years before this coal district can be rehabilitated and twelve to fifteen years before it gets back to normal pre-war output. The first great need is for building in which to house the workman.

"The Saar coal fields were visited by the Bureau of Mines officials. Here, in striking contrast to the mining districts of France and Belgium, the coal industry is at its height. German workmen and German engineers are still employed, but under the direction and supervision of French officers. A spirit of unrest is apparent everywhere, the suspense of the peace negotiations, uncertainty as to indemnity to be exacted and lack of food, is telling on the already broken morale of German workmen. Unfortunately the Saar coal does not give a desirable metallurgical coke to the

French and the blast furnaces now running are working inefficiently. Westphalian coal is much desired and a special committee of which George S. Rice of the Commission is a member left for Cologne to investigate the possibilities of early shipment from Westphalian to France.

"The French attitude toward her allies is an interesting psychological study. France has been hurt, really hurt by the long conflict. She has suffered perhaps more than any other nation, the battles have been fought mostly on her soil, her manhood has been drained of its best and most productive blood, her industries, her economic mainsprings have been ruthlessly destroyed. These two classes of French thought are desirous that France rebuild herself, financed by German indemnity. They seek neither mony nor advice from others; the irrespressible spirit will be all sustaining. Directors of industry, mine owners and employers of labor, possessed of the same love of country, look on the problem from another viewpoint. They claim that money borrowed from other countries at reasonable interest rates, new equipment for mines and plants purchased from America for early delivery, will admit of an earlier return to pre-war scale of operation and the higher immediate cost will be more than offset by the earlier realization of profits from natural resources and raw materials.

"It would be presumption on the part of an American mining engineer to suggest improvements in methods or practice in French mining. The French engineers have long known their own problems and have solved them in accordance with their system of finance and amortization. Their mines are developed and equipped with the idea of permanent industry and unless there is serious labor unrest and extraordinary advances in wage scales, the old French practice is peculiarly suited to French conditions. Their policy is progressive. There is constant search for new mineral areas or extension of proven deposits. French Lorraine has greater iron ore reserves than those of Lorraine Annexee, and just before the outbreak of war, drill holes had shown the extension of the coal measures of Pas de Calais to the south. Iron and coal are complementary minerals. France has them both in larger quantity than in 1914, and when her reconstruction program is carried out, the steel industry will be among the first assets of a land that has suffered greatly."

Ore Receipts at Trail.

Ore and concentrates to a weight of 96,542 gross tons have been received at the Canadian Consolidated Mining & Smelting Co.'s Plant, Trail, B.C., during the first three months of the present year. This compares with 103,118 tons for the corresponding period in 1918, and with 120,486 tons for the first quarter of 1917. It will be appreciated, of course, that the last mentioned years were affected by war conditions. It is well known that, because of present conditions, the smelter management is not seeking ores of any kind. No ore is being accepted from the American side of the line; in fact, 85 per cent of that which is received and treated comes from the company's own properties. Up to the present date only 60 outside properties have shipped to Trail this year.

The monthly details for the first three months of 1919, together with similar figures for the previous two years, follow:

	1917.	1918.	1919.
January	36,570	27,404	35,283
February	40,967	33,989	30,450
March	42,949	41,725	30,809
Tons	120,486	103,118	96,542

COWICHAN MANGANESE DEPOSITS.

It is reported by Mr. G. C. Mackenzie, late of the Canadian Geological Survey Branch, Ottawa, that all available information relating to the Manganese Deposits of the Cowichan District, Vancouver Island, will be published shortly by the Canadian Munition Resources Commission.

Mr. Mackenzie reports on his investigations in August and November in the ore area situated near Cowichan Lake, at the summit of the divide between Chemainus and Cowichan Rivers. He says of the August investigation:

"The ore-body appears to be associated with the quartzite rocks of the Sicker series and consists of manganite and, possibly some psilomelane, which has undoubtedly been derived from the alteration of rhodonite, the silicate of manganese, which is strongly in evidence on both sides of the orebody. Samples taken across the widest portion of the outcrop indicated approximately twelve feet of ore with a metallic manganese content of better than fifty per cent., and with less than fifteen per cent. of silica. Phosphorus was found to be present in amounts generally less than .075 per cent."

After the November examination Mr. Mackenzie says:

"Unfortunately, the owners contented themselves with merely stripping the surface, and while they have disclosed a very attractive outcrop of high grade metallurgical ore they had not during 1918 accomplished any cross-cutting or sinking to prove the quality of the ore depth. This, of course, is to be regretted, as in all secondary deposits of this nature, particularly manganese, the deciding factor as regards the value of the deposit is the extent to which oxidation of the original mineral has taken place. That the owners realize the importanec of this is indicated by the fact that they are now engaged in removing portions of the outcrop to prove the quality of the ore for at least ten feet below the surface."

"If the Cowichan deposits are proved to contain a large tonnage of metallurgical ore such discovery would be of considerable importance to the iron and steel interests of this country. At he present time, Canadian iron and steel works are using something over 1,000 tons monthly of ferro-manganese, all of which is imported either from England or the United States, and therefore if a domestic supply of manganese ore can be assumed its utilization should be carefully investigated. The situation of the deposits with respect to the market in Eastern Canada is unfortunate, and it is a matter of doubt whether it would be advisable to manufacture ferro-manganese on the coast, or transport the ore to Atlantic ports via the Panama Canal."

Fatal accidents in the coal mines of British Columbia over the first quarter of the present year totalled two, of which one was caused by falls of roof and rock and the other by mine-cars and haulage.

PERSONALS.

Dr. W. G. Miller is in London.

Mr. R. B. Watson and Mrs. Watson have returned to Cobalt from New York.

Mr. W. E. Segsworth and Mrs. Segsworth left Toronto on Tuesday April 29th for England.

Mr. Frank Horne, and Mr. O. Gillette, have resumed their former duties on the staff of the Dome Mines.

Mr. George J. Miller, president of the Miller Independence Mines returned north last week from Dayton.

Dr. C. K. Leith has returned to the United States from Paris, where he acted as an advisor concerning minerals.

Mr. Malcom Lang, M.P.P. for the Cochrane district, was a business visitor to Cobalt and Haileybury this week, returning to Porcupine Thursday.

Messrs. A. G. Burros, P. E. Hopkins and W. R. Rogers, of the Ontario Bureau of Mines will leave Toronto shortly for field work in the Kirkland lake area.

Mr. J. A. McVichie, former mine superintendent of the Chambers-Ferland mine, will leave Monday evening for the southern states, and may take up residence either in Utah or Arizona.

Mr. T. J. Flynn, manager of the Fort Matachewan Gold Mines, is a business visitor in Haileybury and Cobalt, having come out by way of Elk Lake. Mr. Flynn states that navigation on the Montreal River has opened this week.

Mr. T. R. Finucane, managing director of the McKinley-Darragh mine, and one of the recently appointed new directors of the Dome Mines, has concluded a visit to both properties, and has returned to his home in Rochester.

Mr. N. J. MacAulay, mining recorder for the district of Temiskaming, has returned to Haileybury, after having given evidence in Toronto relative to the boundary dispute between the O'Brien mine and the La Rose Consolidated.

Mr. J. H. Black, general manager of the Northern Canada Power Company, went to Cobalt last week, and is in the Porcupine camp on business. Mr. Black just recently returned from Texas, where he spent about one month on the scene of the present great oil boom.

Among the present day mine managers of the Cobalt camp, Mr. McVichie is one of the first to have engaged in mining in this field. Indeed, Mr. Vichie, together with T. R. Jones, manager of the Buffalo Mine, represent the only remaining members of that first school who did the pioneer work of this greatest of the world's native silver camps.

Mr. McVichie came to Cobalt some fourteen years ago. Since that time he has served as superintendent of the Temiskaming mine, later at the City of Cobalt, and finally at the Chambers-Ferland mine of the Aladdin-Cobalt Company. As a consequence he is widely known among the mining fraternity of the North, where general regret is expressed over his decision to remove to the south.

HEDLEY GOLD MINING CO.

In a report dated March 1, 1919, President I. L. rill says of the Hedley Gold Mining Co.:

During the past year everything at the mine and mill ran fairly well until December, when the excessive cold weather formed so much marsh ice in the river and in our power flume that it caused us a loss instead of a profit and makes our year's profits small.

Our reserves of ore are a little lower in both tonnage and grade, as a result of our running through the war under high prices for everything and with the same price for gold. Still, I think we did right to continue to operate and pay our high taxes, etc., to help win the war.

The mine still looks fairly well, and if prices for labor and supplies come down to near pre-war-time levels we expect to earn a fair rate of interest on our stock; and with more development we hope to get the mine back into better shape.

General Superintendent Gomer P. Jones says:

From January 1st to April 30th, 1918 (the period of operating under the former owner of the property), there was mined and milled 20,028 tons of ore having an assay value of $11.18 per ton; from May 1st to December 31st, 1918, there was mined and milled 47,285 tons, having an assay value of $9.99 per ton.

The general condition of the labor market and cost of supplies that prevailed during 1918 prohibited development of any extensive scale, although we are of the opinion that the mine has not suffered thereby, except that no sufficient new ore has been opened up to replace the total amount milled. We are confident of doing this, however, as soon as the diamond drill is again in operation, at which time we should be in a position to maintain a higher grade of ore.

TAILINGS PLANT AT COBALT LAKE.

The Mining Corporation of Canada during 1918 constructed and put in operation a plant for treating the mill tailing beds in Cobalt Lake.

The plant consists of a pontoon equipped with two powerful centrifugal electric suction pumps, which have a practical capacity of 17,000 to 18,000 tons per month. These pumps deliver the sands and slimes from the lake beds, directly to a classification plant, from where the pulps are carried by belt conveyors to the mill and treated by concentration and cyanide. The pumping plant also delivers a surplus quantity of tailing to a stock pile near the classification plant, which can be drawn on during the cold weather when the pumps are not in operation. During the portion of the season during which the plant was working, 47,465 tons were pumped, of which 17,633 tons were treated in the mill and an extraction of 40,908 ounces were made.

The Hardinge Conical Mill Co. reports the honorable discharge from war service of J. C. Farrant, its London manager. Mr. Farrant for over four years was held a prisoner of war in Germany. 1st, Lieut. J. J. Cadot, of Air Service, A. E. F. returns to take charge of its Denver office. Capt. Harlowe Hardinge, Signal Corps, Director Radio Schools in the A. E. F. will return to his duties as vice-president of the H. C. M. Co. in the New York office. The Hardinge Company anticipates the early return of three more of its staff and a consequent renewal of its highly efficient service to its customers.

CONCENTRATION OF GOLD-COBALT MOLYBDENITE ORE FROM NEW HAZELTON MINE.

Mr. Nichol Thompson, director of the New Hazelton Gold and Cobalt mine on Rocher de Boule Mountain, Hazelton, has received returns on a car of ore shipped from the mine to the Ore Dressing and Metallurgical Laboratories of the Department of Mines, Ottawa, which are particularly interesting because of the wide variety of metals found in the ore and the thoroughly satisfactory recovery of the content by treatment. The full results of the tests follow:

"A shipment of ore was received on August 6th, 1918, from "The New Hazelton Gold and Cobalt Mines," New Hazelton, B.C. This shipment consisted of 669 bags, which gave the following weights, analyses and content: Net weight (wet), 53,772 lbs.; moisture, 1.01 per cent., 544 lbs.; dry net weight, 53,228 lbs. Analysis, sulphide of molybdenum, 1.40 per cent.; oxide of molybdenum, 00.18 per cent.; cobalt, 1.12 per cent.; nickel, 0.60 per cent.; arsenic, 8.98 per cent.; gold, 1.24 ozs. Content, sulphide of molybdenum, 745.19 lbs.; cobalt, 596.15 lbs.; nickel, 319.37 lbs.; arsenic, 4,779.87 lbs.; gold, 33.00 ozs.

"The object of the test was to concentrate the values in the ore and also obtain a separation of these values as far as practical. As the cobalt, nickel, arsenic and gold values were intimately associated it was feasible to concentrate these by water concentration and also to obtain a separation and conceneration of the molybdenite values by flotation."

The shipment was divided into three lots as follows:

"Lot No. 1, test No. 1, dry net weight, 12144 lbs.; lot No. 2, test No. 2; dry net weight, 35,234 lbs.; lot No. 3, test No. 3, dry net weight, 5,850 lbs.

"Lot No. 1, test No. 1: The procedure was as follows: The ore was crushed to 20-mesh and concentrated on a Wilfley concentrator to remove as much as possible of the cobalt, nickel, arsenic and gold values. Two products were made, a concentrate and tailing. The tailings were reground in a Hardinge mill to 60-mesh and the molybdenite concentrated by means of the Callow Pneumatic flotation process. The flotation tailings were re-run over the Wilfley concentrator to further remove any cobalt, nickel, arsenic and gold values.

"Lot No. 2, Test No. 2:—The procedure was as follows: The ore was crushed to 40-mesh and concentrated on a Wilfley concentrator to remove as much as possible of the cobalt, nickel, arsenic and gold values. Two products were made, a concentrate and tailing. The tailings were reground in a Hardinge mill to 80-mesh and the molybdenite first floated in a Callow unit. The flotation tailings were re-run over the Wilfley concentrator and the tailings from the table were considered final and allowed to go to waste.

"Lot No. 3, Test No. 3:—The procedure was as follows: The ore was ground in a Hardinge mill to 80-mesh and the molybdenite first floated in a Callow unit. The flotation tailings were concentrated on a Wilfley concentrator to remove the cobalt, nickel, arsenic and gold values, and the tailings from the table pumped to waste.

This latter test was run to obtain a comparison of results between tabling followed by flotation and flotation followed by tabling.

"The results are contained in the attached tables.

"Conclusions: From the attached summary, the actual recoveries made on this carload of ore were as follows:

"In table concentrates: cobalt, 72.6 per cent.; nickel, 87.5 per cent.; arsenic, 84.9 per cent. In flotation products: molybdenite, 54.4 per cent. These recoveries should be improved upon in practice where a closed circuit could be maintained and the losses due to handling and slime overflow would be reduced to a minimum.

"As the molybdenite values are of secondary value as compared to the other metals present, it is advisable to remove as much as possible of the cobalt, nickel, arsenic and gold values before flotation to recover the molybdenite values. Most of these values can be removed at 40-mesh, and, as it is necessary to grind it to 100-mesh to recover the molybdenite values, it would not be wise to float first and table afterwards, as the loss in cobalt, nickel, arsenic and gold values due to fine grinding would not compensate for the higher recovery of the molybdenite.

"From the test work conducted, the procedure to follow in the concentration of this ore would be as follows: The crude ore crushed in a jaw crusher to 1½ inch or 1 inch and ground in a wet ball in circuit with a classifier to about 40-mesh and concentrated on tables of the Wilfley type; the table tailings reground in a ball or tube mill to 100-mesh in circuit with a classifier and the molybdenite floated in an oil flotation unit; the tailings from the flotation unit concentrated on slime tables or vanners."

A NEW PROCESS FOR TREATING COPPER ORE.

A new process for the treatment of copper ore is being demonstrated in the City of Vancouver B. C. The late A . A. Lockwood and C. J. A. Dalziel, British metallurgical engineers, are said to be the discoverers of this method, for which it it claimed that il will extract copper from the crude ore in twenty-four hours, at a much lower cost than is now involved, and that it will recover not less than 85 per cent of the copper content of the most complex ores. The Lockwood-Dalziel process is described as being the leaching and electrolytic recovery method speeded up by mechanical agitation and other devices hitherto unused in the treatment of copper ores. Filtration and sedimentation are eliminated, much time thus being saved. Then, too, there is the saving of plant, the original investment being reduced so materially in this respect as to make considerable difference in the cost of treatment. It is stated on good authority that the prime object of the demonstration referred to is to prove that the Texada Island property on the Norseman Exploration Company, of Minneapolis, can be operated. This property has been lying idle for years, but now is likely to be opened on a considerable scale. If the new process can make an 85 per cent. recovery of the copper content of the ores, which is reported to have been proved, the claims can be converted into a shipping mine forthwith. A plant may be installed on Texada Island without delay. About $250,000 is said to be ready for the investment and mining men are much interested in watching the development of what promises to be an important new industry.

Platinum in Eby Sulphide Ore.

Platinum values have been found in a large sulphide body in the township of Eby. Heretofore the big vein had been found to carry encouraging values of gold and silver, in addition to a high percentage of sulphur. It was only recently that a test was made for platinum.

Special Correspondence

NORTHERN ONTARIO.

Indian Peninsula Mill Nearly Completed.

The mill at the Indian Peninsula molybdenite property, situated near Ames in north-western Quebec is almost completed, and will be set in operation late in May. The winter roads having broken up, and navigation not yet being open, delays have been met with in the delivery of a number of small parts for the plant.

The flotation process is to be used, the plant having a capacity for treating 50 tons of ore daily, and provision having been made to increase to 100 tons daily when the need for such an increase becomes necessary.

Bald Island.

Mining interests at present closely identified with the leaseholders of the Foster Mine, at Cobalt, are reported to have secured an option on Bald Island, situated in Night Hawk Lake, in the Porcupine district. A narrow vein containing considerable visible gold is in evidence upon the island, and sinking operations are to be commenced. Bald Island lies in close proximity to Gold Island, on which one of the first gold discoveries in this district was made.

Casey Mountain.

Operations have been carried to a depth of 380 feet on the Casey-Mountain property, situated about two miles north-east from the Casey-Cobalt mine. In the course of driving the shaft a layer of diabase some 270 feet in thickness was cut, followed by a layer of conglomerate about 110 feet thick. A strong and well defined vein was followed, and low grade silver values were encountered.

It is now proposed to begin lateral operations in the conglomerate formation at a point about twenty feet above the lower contact.

Motor Road for Kirkland.

All the leading mines of the Kirkland Lake camp are now on record as favoring a first class motor road in preference to a branch line of the steam railway. A petition has been drawn up and presented to the government with a view to inducing the abandonment of the steam railway project.

The consensus of opinion now seems to be that the Government will perhaps welcome the suggestion, and may be very glad to provide a motor road which would cost but $12.000 per mile, or less than one-half the estimated cost of a railway.

Anzac Company Operating Armstrong-Booth Property.

Diamond drill operations are now well under way at the property formerly known as the Armstrong-Booth, in the Porcupine district. The propetry is now known as the Anzac Mining Company.

The property consists of eight mining claims situated adjacent to the Plenaurum property at the east end of Pearl Lake. In the early days of Porcupine this property was explored on surface with encouraging results, but was never operated extensively.

Bewick-Moreing's Interests Sold.

The mining interests of the Bewick-Moreings, in the Porcupine field are reported to have been sold to an American Syndicate. This concern held considerable property in the Porcupine camp, but never conducted aggressive or extensive mining operations. The concern was a heavy holder of stock in the original Hollinger Mine, but disposed of its stock prior to the consolidation of the Hollinger with the Acme Gold Mines, Limited, and the Millerton Gold Mines, and certain building, plants and equipment of the Canadian Mining and Finance Company.

Dome Mine.

The power plant of the Dome Mines Company is gradually being brought into full use. It is understood another 25-drill compressor has been brought into service, thus increasing the capacity to 50-drills.

Miller Lake-O'Brien.

During the week ending April 18th, the Miller Lake-O'Brien mine, of Gowganda, shipped a car containing approximately 64,000 pounds of ore.

The shipment was consigned to the Deloro smelter for treatment.

Working Old Reliance Property.

Operation which commenced on the old Reliance property, near the Kerr Lake mine, have resulted in the production of about 28,000 ounces of silver since late in November. The property is being worked under lease by John Shaw and E. Dean, a small force of men being engaged.

Hollinger.

The current rate of production at the Hollinger Consolidated is the highest in the company's history. The statement just issued which shows $1,368,980 produced during the first twelve weeks of the year, indicates an output of $5,948,405 annually. However, whereas the report covered the period up to March 25th, it is interesting to know that operations have been greatly speeded up since that date. During the period under review the mill ran a little less than sixty per cent. of possible running time, or at an average of 1,646 tons daily. It is considered very significant that such a record should be established on such a tonnage. With the plant working at 98 per cent. capacity, as has been since reported, it is evident the daily average will approximate 2,646 tons. On the basis of $9,15 ore, which the average throughout the mine, an output of $24,310.90 daiy is indicated or about $7,873,478.50 yearly. It is considered probable dividend disbursements will shortly be increased to perhaps one per cent. every four weeks, or thirteen per cent. annually.

Oxford-Cobalt.

Work has been started on the Oxford-Cobalt property, situated in the Gillies Limit directly south from the Kerr Lake Mine. The company owns blocks A-100 and C-1000, it being proposed to sink to a depth of 200 feet on a strong calaite vein which shows on surface, and which carries low silver values at outcrop. The geological conditions are somewhat similar to the Beaver-Temiskaming-Adanac area.

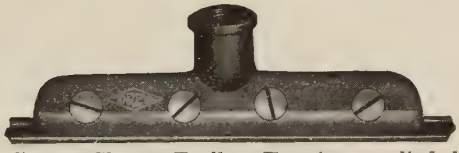
Oil Flotation for Reeves-Dobie.

It is understood the Reeves-Dobie mine at Gowganda, will instal oil flotation equipment, the first plant of its kind to be installed in the Gowganda field.

Mining men throughout Canada are endorsing without reservation the action of the executive of the Canadian Mining Institute in asking the Dominion Government to place a representative of the Mining Industry on the Industrial Commission being appointed to investigate the relationship between capital and labor in the Dominion. The name of D. H. McDougall, president of the Nova Scotia Steel & Coal Company, is put forward in this connection by the Institute.

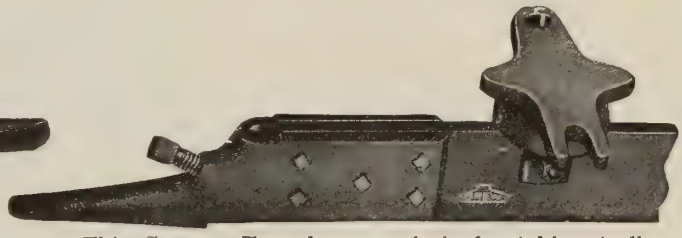
DREW OVERHEAD MATERIAL

This feed-in- Screw Clamp Trolley Ear is made from bronze with horizontal feeder lug to accommodate 0000 size feeder wire. This ear can be furnished tinned if so desired.



This Screw Clamp Trolley Ear is supplied both in malleable where the ears are galvanized by the hot dip process or in bronze. It can accommodate grooved or Figure Eight to 000 size.

This Samson Splicing Ear is installed without special tools, stays upright in the span, cannot make a hard spot in the line and is non-arcing. Repeated service records show that the Samson will outwear the wire in which it is installed under the most severe operating conditions.



This Samson Tunnel approach is for taking trolley into barns, under bridges, elevations or through tunnels where there is a minimum clearance. It is good practice to place the insulated hangers about six feet apart. The tapered "V" shaped lips of the Samson Approach give smooth under-run.

This hanger has a galvanized Clevis with ⅜ x 1½ in. machine bolt, and is for use in connection with the Samson Tunnel Approach shown above.

This hanger is used when the trolley is supported in shallow wooden trough or like places such as mines or structures with low rods. Its height has been reduced to a minimum.

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Coke Ordered For Grand Forks.

There does not seem to be any immediate likelihood of the Granby Company's smelter at Grand Forks closing down, as an order was placed recently for the shipment of 900 tons of coke weekly from the Fernie Collieries to this plant.

May Operate Smelter on Co-operative Plan.

A. H. Rogers, consulting engineer for the Canada Copper Corporation, Ltd., was in British Columbia recently and conferred with Oscar Lachmund, metallurgical engineer, and a committee of the citizens of Greenwood, with reference to the Greenwood Smelter, now idle, and mining properties of the Canada Copper Corporation contiguous to the smelter. Mr. Lachmund, who is acting in an advisory capacity to the citizens, hopes that some arrangement may be reached whereby the citizens may realize their ambition that the plant should be re-opened and mining operations in the district resumed. Mr. Rogers, it is understood, was asked to place a price on the plant, and it is considered likely that he will do so, in which event the citizens, who are a unit in the matter, may arrange to take over the property with a view to opening it on a co-operative basis. Mr. Lachmund in an interview in this connection said that there was much to encourage the prospector in the country about Greenwood, and in the Slocan division. These fields were likely to become attractive to returned soldiers and their attractiveness would be increased with the carrying out of the government's policy of the establishment of sampling works in various mining sections of the province. He added: "The success which may be achieved in operations on a small scale is illustrated by the performance of Duncan McIntosh, who removed $100,000 in high grade ore from the Bell Mine of Beaverdell District, on Wallace Mountain, in two years, out of which he took up a bond of $26,000 on the mine and a profit besides. Lessees are at work on various claims in this district. The veins are narrow, but they persist into depth, evidence of which is found in the Carmi, which represents a geological level 1,000 feet deeper than the Wallace Mountain claims."

Hyatt Steel Products.

Announcement has been made of the completion of negotiations whereby the Hyatt Steel Products, Ltd., of Granville Island, takes over the Canadian Metals, Ltd., Tudhope Electric Metals, Ltd., and the Steel Rolling Mills at Port Moody, B. C. The new concern thus becomes one of the largest iron and steel industries in Wesern Canada and with the greater facilities obtained through the fusion of interests the company's operations will be considerably extended. The important branch of the industry is steel manufacture, it being asserted that tests conducted at the Tudhope plant, False Creek, have established its practicability. Operating a three phase electric arc six ton furnace, of 1,500 kilowatt capacity, steel has been poured and declared to be of the highest quality. The company's intention is to make the ingots at this plant and roll them at the Port Moody Mills. For some time low phosphorous pig iron has been manufactured at the Tudhope plant. The company has it own power substation.

Concentrator Nearing Completion.

The concentrating plant under construction on the Idaho-Alamo Mining Property, near Sandon, B.C., is nearing completion and should be ready for tests before the tramway, with which it is to be served, is in shape for operation. The plant covers about an acre of ground and the mill, which has a capacity of 300 tons, is costing about $200,000. Its equipment is exceptional in diversity, having been designed to concentrate ores from several mines, and the workmanship is first-class throughout. The mill will be required to dress ores from the Sovereign, Wonderful, Queen Bess and Idaho-Alamo Mines, all of which are owned by Clarence Cunningham and associates, and the development of which is said to have demonstrated that a large tonnage is assured.

Lower Wages.

There is a marked tendency towards the lowering of miners' wages in the Ainsworth-Slocan district as well as throughout the province. A reduction of 25 cents per shift has gone into effect at the Florence mine, and it is likely that similar reductions will take place in connection with other operating properties. It is stated by the management of the Cork-Province mine that operations at the mine on the South Fork will not be resumed unless a 50 cent per shift reduction is accepted by the men. During the past year or so the prevailing scale for miners in the Slocan and Ainsworth Mining Camps has been $5.00 a shift for miners. This rate still is in force in the mines around Slocan. No doubt justification for the smaller scale will be found by the operators in the fact that reductions of $1 per shift have been made in the Coeur d'Alenes and Butte, that forces are being reduced steadily, and that the uncertainty of the metal markets, particularly with reference to lead and zinc, make wage reduction necessary.

Will Dredge for Gold in Yukon.

Confidence in the Yukon's resources is exemplified by two new post-war enterprises. One is the Forty-Mile Power and Dredging Company, backed by New York capitalists, said to include the Eastman Kodak and Curtiss Biplane companies. The company has acquired ninety-six miles of river claims and hydraulic benches along the Forty-Mile River near Dawson. Its capitalization is $5,000,000. The second enterprise is headed by Lewis Titus, pioneer Yukon dredgman, and A. McVicar, of Seattle, Wn., who have secured a dredge which will be taken from McQuestion River this season to dredge the Highet Creek placers. All old-time dredge and hydraulic companies on the Klondyke Rivers are preparing to start the season's operations in May. There is said to be plenty of labor available there at present.

Yukon Needs Railways.

The construction of a line of railway through Northern Alberta and Northern British Columbia to the Yukon is the chief proposal in a somewhat ambitious programme which is being urged by the Yukon Development League in a determined endeavor to bring Canada's great northland in closer touch with other sections of the Dominion. The Federal Parliament has been asked to provide funds for a survey of the contemplated railroad, it being suggested that the line should tap one of the transcontinental roads. It is

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asserted that such a road would open up a richly timbered, farming, grazing as well as a practically unexplored mineral country.

The Yukon territory, containing about 192,000 square miles, more than half of which is habitable, is still practically without railway connections. It is pointed out, in support of the Yukon's claims, that it sent over 600 men to the Great War; gave cash contributions to the war greater per capita than any other section of the British Empire, and up to the present has produced over $200,000,000 in gold.

The Providence Mine.

Greenwood, B.C.— The Providence Mine of this district is reported to be showing considerable activity, development work necessary for more extensive work having been satisfactorily completed. Ten men have been employed all winter and fifty more will be engaged for the summer. One carload of ore has been shipped to the Trail Smelter.

Urge Government Control of Oil Lands.

A resolution urging the Dominion Government to hold in perpetuity the oil deposits of the Province of Alberta and other parts of Canada was passed at a recent meeting of the Canada Council of Agriculture held at Winnipeg, Man. It also is asked that the government undertake the development of these natural resources for the public benefit. In this connection it is interesting to note that several representatives of Western Canadian constituencies have organized a provisional Natural Resources Commission, which probably will develop into a permanent body, and the chief purpose of which is to try and induce the government to adopt a well-defined and permanent policy in regard to the development of the natural resources of Western Canada.

Will Make Carbide on Vancouver Island.

Vancouver Island is to have a new industry. A factory for the manufacture of carbide for export to Australia, New Zealand, and Asia is to be established. Union Bay is likely to be the site for the plant, as it is close to the cheap hydro-electric power of the Puntledge River plant of the Canadian Collieries (D), Ltd. Coke also is available on the spot, and high grades of limestone can be obtained in the vicinity.

Trail Smelter.

The Consolidated Mining and Smelting Company has 8,266 tons of lead that remained unsold on March 1, according to a report from its Trail office. This may be compared with 9,042 tons on February 1st. The receipts in February were 1,435 tons, which increased the surplus to 10,477 tons, but the sale of 2,211 tons made at 7.835 cents a pound reduced the quantity to 8,266 tons. The unsold surplus includes 2,382 tons on hand at the end of October; 1,346 tons made January, and the 1,435 in February. The February price is reduced to 7.61 by the freight adjustment referred to in circulars of July 21 and November 1. The February sales are applied as follows: Balance, August, 35 tons; September, 1,811 tons; to apply to October, 365 tons. "We are settling for September lead at 7.61," says the report. "We still have a balance of about 500 tons to deliver to the Imperial Munitions Board at the War Price."

Gibson Mining Company.

An injunction restraining D. K. May, Minnie M. May, and the Gibson Mining Company from disposing of or in any way interfering with shares of the company, which company is in possession of the Winthrop and Butte Groups of mineral claims on Cariboo Creek, has been continued by Chief Justice Hunter until after the trial. Louis Chassy and J. M. Wolbert are bringing action for a declaration that they are half owners in the claims. In Wolbert's affidavit it is alleged that a transfer o fhis holdings was made on the authority of a power of attorney to which his name was forged.

Privy Council to Decide Title to Coal Lands.

Title to the under-surfaee rights in foreshore lands within what is known as the Esquimalt & Nanaimo Ry. Belt on the East Coast of Vancouver Island will be decided by the Privy Council. At the hearing of the test case which will decide the whole issue Hon. J. W. deB. Farris, Attorney-General for the Province of British Columbia, will represent the Province, leaving for England for the purpose in the month of June. This test action relates to foreshore lands in Chemainus Harbor covering which Provincial licences have been granted to H. W. Treat, of Seattle, Wn. The case has been through the lower courts and in each case, up to the present, the E. & N. Ry. Co. has been defeated. The Privy Council now will decide whether the Province can issue good licences to these coal lands and its judgment, of course, will be final.

Developing New Coal Areas.

New coal areas are being developed both on Vancouver Island and in parts of the British Columbia interior. On the Island licences have been applied for in the Comox district and it is understood that T. R. Stockett, formerly of the Western Fuel Company, Nanaimo, B.C., is organizing a Company in Seattle to develop the coal of these lands. H. W. Treat, of Seattle, also is proceeding with his preparations to open up areas which he has acquired on Chemainus Harbor, apparently confident that the Provincial title which he has acquired will be upheld by the Privy Council. Besides it is authoritatively announced that coal measures two and a half miles south of Kamloops B.C. are to be worked again after many years. Some eighteen years ago the blacksmiths of Kamloops and some of the householders of the community used to burn this coal. James L. Brown, of Vancouver, has held the ground for some time. Accompanied by David Evans, consulting engineer, Mr. Brown has returned from an inspection of the property and, as a result of Mr. Evans' examination and on his recommendation a diamond drill is to be used to determine the extent of the coal measure. The coal is high bituminous in character and the measures are reported by Mr. Evans to be of the same age and series as those of Vancouver Island.

Two Shifts at Galena Farm Mill.

The Galena Farm Mine, Silverton, B.C., is being developed with satisfactory results. Work up to the present shows the vein to be continuous, ore is piled up ahead of the mill, and a considerable reserve of broken ore is available. The mill started recently with two shifts, and will run full blast so long as there is enough water for operation. A. J. Baudette, consulting engineer, thinks the mine's prospects are good.

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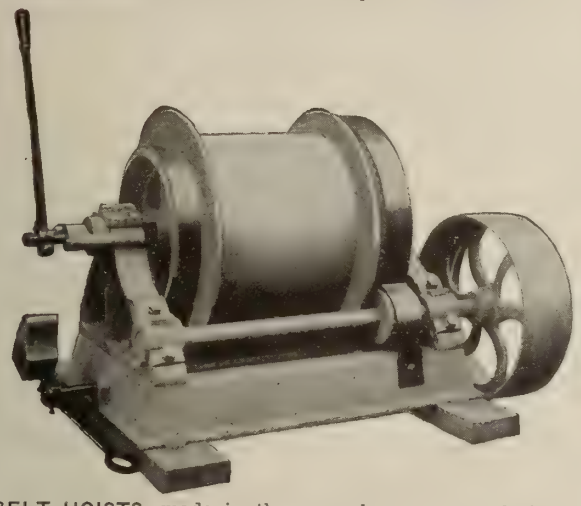

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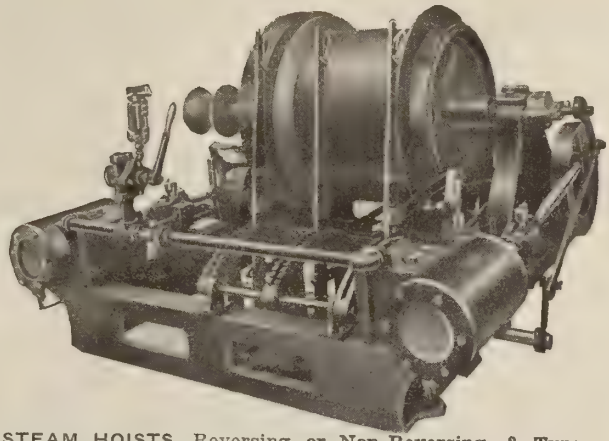

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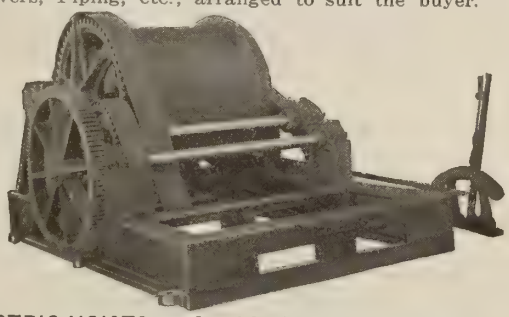

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Canadian Collieries vs. Pacific Coast Coal.

An action is in progress in the Courts of British Columbia in which the Canadian Collieries (D) Ltd. are the plaintiffs and the Pacific Coast Coal Mines, Ltd. the defendants, the suit being for damages for trespass and for an accounting and payment for coal alleged to have been taken from the Alexandre Mine Property, South Wellington in 1911. The plaintiffs maintain that the coal was taken without their knowledge or consent and it is understood to be the plea X of the defendants that whatever was done by them was with the consent of the plaintiff company's officials.

Settlers' Coal Rights.

With further reference to the Settlers' Rights Act of British Columbia, which was disallowed by the Dominion Government in 1917 and on being re-eacted by the Province last year was refused the signature of the Lieut.-Governor, it is interesting to note that the Vancouver Island Settlers interested are making a move to bring their case directly to the attention of the Federal Government. Meetings of those who have property without the coal rights therein have been held and it is probable that a delegation will leave the Pacific Coast shortly to carry the grievances to the ears of those in control at the Canadian Capital.

Will Work Leach River Property.

The Leach River, Vancouver Island, is likely to be worked on a large scale for gold, platinum and talc. A company is being formed for the purpose and some of the necessary plant already is on the property. The Leach River is familiar to all old timers. Fifty years ago it was the scene of some excitement, and for an extended period was popular with the individual placer miner. In fact the river bed and benches have been worked on and off ever since, and it is seldom that one cannot obtain colors by washing out a pan.

Building Small Furnace for Maple Leaf Mine.

The Maple Leaf Mine is putting in a small smelter at Franklin Camp to treat its ores. The furnace is being made at Grand Forks, and will have a capacity of 50 tons a day. The furnace has a dimension of 44 in., and is of cupola type. A 35 h-p. gasoline engine will be used to drive the blower. The ores which are to be handled contained chiefly copper and silver values, although assays made last summer by a government representative disclosed small amounts of platinum.

Copper Mountain Railway Builders Strike.

The construction of the branch railway to Copper Mountain, where is situated the newly developed mining property of the Canada Copper Corporation, has received a temporary check. Three hundred laborers employed by the contractors have laid down their tools and refused to go back to work. They claim they were asked to work 10 hours a day at the same wage as was given for 9 hours' work. Now they want an 8-hour day and a fixed wage of 50 cents an hour, or $4 a day. The strikers are orderly, no trouble having been experienced in the little towns of Princeton and Allenby, which are the communities nearest to the mining camp.

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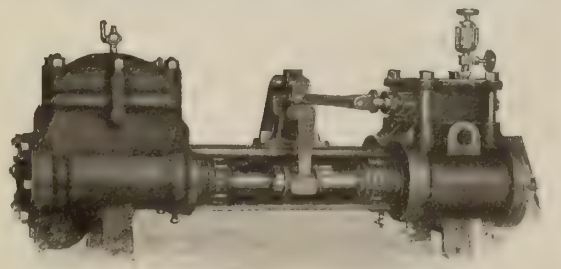

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:-: EDITORIAL :-:

GEOLOGICAL SURVEY REPORTS.

The Geological Survey has published a summary report on work done during 1918 in British Columbia and Yukon. The authors are W. E. Cockfield, C. Camsell, V. Dolmage, B. R. McKay, S. J. Schofield and M. F. Bancroft. Mr. Cockfield reports on Mayo area, Yukon and silver-lead deposits of the Twelvemile area, Yukon. Mr. Camsell reports on mercury deposits of Kamloops lake; boring operations for oil in the vicinity of Vancouver; the Copper Mountain area; and platinum investigations. Mr. Dolmage writes on Quatsino Sound and Mr. MacKay on Cariboo gold fields. Mr. Schofield reports on Britannia map area and Ainsworth mining district. Mr. Bancroft reports on Lardeau map area. These gentlemen are to be congratulated on getting their reports ready for publication in a reasonable time.

SOME PLAIN TALK.

Col. Thomas Cantley, in his presidential address to the Mining Society of Nova Scotia spoke strongly against the tendency to favor putting all industries too largely under government control. He wants captains of industry to be allowed to get back to work.

Industries during the war were properly taken more largely under government control for war purposes. There has since been a desire on the part of many to see government control continued and made more complete. Others consider that the industries enlisted for war purposes should now be unfettered, and allowed to develop according to the ability and energy of the individuals connected with them. Our readers will find Col. Cantley's address elsewhere in this number.

MINING INSTITUTE MEETINGS.

An account of the annual meeting of the Mining Society of Nova Scotia, held in New Glasgow, is given in this number of the Journal. Much of the credit for the success of this meeting belongs to Mr. F. W. Gray of the staff of the Nova Scotia Steel & Coal Co. Our readers will be pleased to learn that Mr. Gray, who is an authority on the coal mining industry, is joining the staff of the publishers of this Journal and will be Associate Editor of the Journal. Mr. Gray will devote his attention chiefly to coal mining and to general mining in the Maritime Provinces.

In concluding his comments on the New Glasgow meeting, Mr. Gray makes some suggestions respecting meetings for consideration of members of the Canadian Mining Institute. We would be pleased to have comments on these suggestions, with a view to making the meetings more useful to members and the industry.

We have one suggestion to make. It is that some endeavor should be made to have, during the summer, local meetings in some of the mining camps, which would be made sufficiently attractive to bring men from other parts of the same province at least. For instance we might this summer have in Ontario visits to the gold and silver mining centres. To attend such meetings we would invite all interested in the mining industry.

MINING.

Recent discussion among members of the Canadian Mining Institute makes it more than ever evident that the term "mining" is understood to mean very different things by different persons. Some of the metallurgists, notably those in the iron and steel industry, like to consider that mining is the proper term to apply to the taking of ore from the ground, while the term metallurgy should be applied to the processes for winning the metals from the ores after the mining has been done. This would be in accordance with test book definitions. The term "mining" is, however, commonly used in a much wider sense.

A mining company that limits its attention to the extraction of ore is the exception rather than the rule in Canada. For many years gold mining companies have considered it their business to produce metallic gold, but none have found it desirable to call themselves gold mining and metallurgical companies. The latter term is superfluous in this connection.

We have before us the report of the Nipissing Mining Company for the year 1918. The report shows that the company produced and shipped during the year silver bullion worth $5,485,427, and residue and concentrates worth $352,099. We find in this report a detailed analysis of the cost of treating the ore. We find remarks on metallurgical problems as well as underground development. We find a record of income and expenditure; of exploration, development, and production; of costs and profits. This is the ordinary business of a mining company. Metallurgy is a necessary branch of mining as the term mining is used in the mining business. Managing ability, commonsense and good salesmanship have, however, their place in this industry as in all others.

OUTLOOK FOR COBALT SILVER MINES IS PROMISING.

The removal of restrictions on the price of silver seems likely to result in an advantage to producers. At the ruling prices there is assured successful operation of many mines at Cobalt. If the price goes much higher a market will be made for very low grade ore. This will lead to further exploration of supposedly worked-out properties. The Cobalt area has as many lives as a cat. It is particularly fortunate that the high prices have been obtainable during the period of high costs, for otherwise much silver that has been marketed would have remained in the ground. An excellent opportunity to get out an exceptionally large percentage of the silver in the Cobalt area is afforded by the present price of the metal. If, as seems possible, the price rises materially, an even more complete clean up than has ever seemed likely will be made. Cobalt has a wonderful record in many ways. It has made not only a very large production of silver, but it has done so at an unusually low cost. The demand for the metal seems likely to add further laurels to Cobalt, for the price warrants every attempt being made to increase the percentage of recovery.

MANUFACTURERS IN CONVENTION.

The twenty-fourth annual convention of the National Association of Manufacturers will be held at the Waldorf-Astoria Hotel, New York, on May 19, 20 and 21. The convention will discuss prevalent forms of social and industrial unrest, government of railroads, government, supervision and stabilizing of trade prices, federal revenue and tax legislation, employment relations, the employer's duty to provide jobs for soldiers, the approaching revision of patent laws, the industrial legislative outlook, and vocational training.

WESTERN ONTARIO IRON ORE DEPOSITS.

In this number a correspondent calls attention to Ontario's undeveloped iron ore resources. The war has directed the thoughts of all to the importance of iron and coal mining industries. Under the circumstances our correspondent's remarks are very timely. He does well to point out that while comparatively little investigation has been carried on, we are too ready to assume that the development of iron ore in Western Ontario is not commercially feasible at present.

It is true that we do not know much about our iron ore deposits. A large part of the little work that has been done, has been done by and for Americans interested in the Lake Superior iron ranges. We have benefitted to some extent by such work, but it is high time that Canadians made some endeavor to determine the nature and value of our deposits. We should have the iron areas examined and geologically mapped with a view to directing attention to the more promising areas and assisting those who undertake development.

CHICAGO MEETING—A.I.M.M.E.

The American Institute of Mining and Metallurgical Engineers will hold its convention in Chicago, September 22nd to 26th. This meeting promises to be one of decided importance to the industry, as subjects of vital concern will be under discussion.

In addition to the technical talks, an elaborate social programme is being arranged and excursions by the Institute as a body are planned to many points of interest in the vicinity, including the Steel Mills at Gary, the oil refineries at Whiting, metallurgical plants at East Chicago, and North Chicago, and to the LaSalle district, where the cement, coal and zinc industries are represented.

DOMINION ENGINEERING AND INSPECTION CO. OPEN VANCOUVER BRANCH.

The Dominion Engineering & Inspection Company, engineers and chemists, of Montreal, have recently opened an office in Vancouver at 44 Canada Life Building, Hastings Street West, under the management of Mr. John B. Croly, who is well known to engineering and construction interests in this district.

The business built up by this company in Montreal, Toronto and Winnipeg, has been conducted along sound professional lines, and it is interesting to note the company's confidence in the future of Vancouver and British Columbia generally, in opening an office in this province.

THE CANADIAN MINING MANUAL.

The publishers of the Canadian Mining Journal announce the appearance of a new edition of the Canadian Mining Manual. The editor has endeavored to make this a useful handbook for those interested in Canadian mines and minerals. Some idea of the contents of this manual will be found on another page.

MOLYBDENUM AND TUNGSTEN.

A communication has just been received by the Department of Mines from the Colonial Office, London, announcing a change in policy in regard to the purchase of molybdenum and tungsten ores. The communication states: "During the war the production of these ores throughout the world has increased enormously, while the demand has since the date of the Armistice greatly decreased. The stocks in this country, or on the way will be more than enough to meet the requirements of the United Kingdom for at least eighteen months. If the arrangements by which His Majesty's Government buy the Empire output of these ores are continued, by the end of 1919 there will be in stock in this country enough to meet the requirements of the United Kingdom, home and export trade for no less than two years, and as these stocks will have to be realized at a price not higher than the world's price, which will presumably be much lower than that now paid by His Majesty's Government, there will be for two years no market in this country for Empire ores and the effect will almost certainly be that many mines within the Empire will have to close down, and the result to the future of the industry might be disastrous.

In the circumstances the only satisfactory solution for both His Majesty's Government, and the producers, appears to be an agreement by which the Empire output and shipments to this country will be drastically reduced for the present, thus allowing stocks to be realized and the world's market to settle down so that the industry might resume normal working as soon as possible. Consequently the Minister of Munitions has decided to terminate the existing purchase arrangements at once, and will not accept delivery of any tungsten ore or molybdenite loaded from British Oveasea ports on ocean steamers after the 30th of April.

In addition, the Minister of Munitions hopes producers in their own interests will take immediate steps to reduce the production of these ores."

On April 29th before Mr. Chas. Macnab, Magistrate of the County of Carleton at Ottawa, Mr. A. S. Munich, Manager of the Kingdom lead mine at Galetta, was fined $100 and costs for allowing a cage to be used for the raising and lowering of men which was not equipped with safety devices as required by the Mining Act of Ontario.

Carbide Lamps.

The Justrite Manufacturing Co., Chicago, has just issued a catalogue illustrating miners' carbide lamps. A large number of lamps are shown and specifications given. The catalog is of the loose leaf pattern and the company plans to keep its customers supplied with complete up-to-date illustrations of its products.

Meeting of the Mining Society of Nova Scotia

The twenty-sixth regular Annual Meeting of the Mining Society of Nova Scotia was held in New Glasgow on the 23rd and 24th of April, about seventy-five members and visitors being in attendance. The occasion was the first on which the Annual Meeting had been held outside of Sydney since the Society's headquarters were moved there from Halifax. The Council had some hesitation in selecting New Glasgow, as it was feared the distance from headquarters might cause a meagre attendance, but on the other hand it was felt that some consideration of the claims of the Mainland members was required, and that further, New Glasgow was not far away from Halifax, and was more convenient for visitors from the West.

Col. Cantley's Address.

Colonel Cantley, the President was in the Chair, and following the transaction of routine business in the opening morning session of the 23rd, delivered the presidential address, which is published elsewhere in this issue of the Journal.

Mr. Cole's Paper on the Salt Industry.

At the afternoon meeting Mr. L. H. Cole, of the Mines Branch, presented a paper dealing exhaustively with occurrences of salt and brine in Canada, and the salt industry as a whole. Mr. Cole's remarks were chiefly descriptive of the numerous and excellent lantern slides shown, which illustrated the recovery of salt from sea water, from brine springs and crystalline salt deposits. An interesting feature was Mr. Cole's full explanation of the varied methods of evaporation used in concentration of brines, most of which was in the nature of new and fresh knowledge to the coal and metal miners and steel men who composed a very representative Nova Scotian gathering. Description of the important salt industry and its outgrowth of chemical industries in the neighborhood of Windsor, Ontario, came as a surprise to most present, who had not realized that a second and greater Northwich had arisen. Special interest, however, centered around the recent discovery of rock-salt at Malagash, Cumberland County, Nova Scotia, which was fully described in a recent issue of the Journal by Mr. Cole, and is now being developed by Messrs. Chambers of New Glasgow.

In this connection Dr. Hayes of the Geological Survey mentioned a reference made in 1840 by Dr. Abraham Gesner, one of the geological pioneers of the Maritime Provinces, to the presence of salt springs in the district of Malagash, and pointed out the necessity to trace the brine flow to its crystalline source, and the possibilities of a salt industry to supply the requirements of the "British Provinces," remarking that the "infancy of the colony was but a trite apology for backwardness in development of natural resources!"

Mr. Cole's talk and the lantern slides were much appreciated, and the Department of Mines does well to pay attention to the non-metallic minerals of Canada, and does still better in making its work known.

The Council of the Society, bearing in mind the interest of its members in steel manufacture and coking processes hopes that Mr. Cole at the next Annual Meeting may tell them something of the silica deposits of Canada, and the resources of the Dominion in refractories.

Refractories.

A paper descriptive of some important developments in the home manufacture of refractory bricks and shapes by the Dominion Iron & Steel Company had been looked for, but it was thought better to leave this paper until the results obtained were more definitely ascertained and tested. Although Nova Scotia, so far as is now known, is unfortunately short of high-grade refractory clays, there is an abundance of silica in occurrences of great purity, and Nova Scotia does not expect to be always so dependent on outside sources for refractories as is the case to-day. It cannot be said that as yet the clays and shales associated with the coal seams are either known fully or tested for suitability to any appreciable extent, and the very close resemblance between the coal measures of Nova Scotia with those of other countries where valuable clays are found in association with the Millstone Grit and the productive Measures, indicates that hope for the discovery of better clays than are now known is well founded.

"Romance and Rascality in Mine Promoting."

Mr. C. M. Odell removed any tendency to stiffness which may have lingered in the meeting by a contribution on "Romance and Rascality in Mine Promoting." The title of this paper had been wrongly printed in advance as "Romance and Rascality in Coal Mining," but the speaker explained that he knew of no reason to think that coal mining was more distinguished in regard to romance or rascality than other kinds of mining.

Mr. Odell's satirically humorous philosophy has come to be rightly regarded as one of the features of the Mining Society's annual gathering. To those who are acquainted with Mr. Hoover's translation of Agricola the following excerpt from Mr. Odell's remarks will seem reminiscent, and show how great minds have thought alike in all ages. Mr. Odell speaks thus:

> "The lure of the wanderlust and the innate gambling instinct of the Anglo-Saxon lead men to the mining camp and the lumber woods. The thirst for wealth drives men to discovering mines and a philanthropic instinct prompts them to offer the stocks and bonds to a guileless public, whose desire for easy money is in inverse ratio to their ability to acquire it. Faced with the problem of gazing at a mean ticket with the rim all punched out, the young man gravitates between going into politics promoting a mining enterprise. This last-named, i.e., promoting, seems to be the safest method of prying a living loose from this earth; as trying to get a dividend from a mine by legitimate means — for the original investor — is about as hopeless as setting a hen on a porcelain door-knob and expecting her to hatch out a row of miners cottages."

Mr. Odell enlightened the Society as to the probable origin of a well-known description of a mine. At the time when the promoter's of King Solomon's Mines were flooding the Nile Valley with watered stock, the chief advisor of Rameses II is reported in conversation with his master as follows:

"Rammy, my boy, Rammy," sez he, "Rammy, you're right, a mine is a hole in the ground, and the owner is a liar!"

Mr. Odell's admixture of modern instance with ancient fable did not prevent him from giving the members some real information on early mine promotions in Nova Scotia.

"Tunneling on the Western Front."

Lt. George Morley, M.C., formerly on the survey staff of the Dominion Coal Company, and now invalided home from active service gave a paper, illustrated with diagrams, on "Tunnelling on the Western Front," which will be found elsewhere in this issue. Lt. Morley was intimately connected with some of the major tunnelling operations of the Canadian forces near St. Eloi and with the large mines whose explosion preceded the taking of the Messines Ridge. He gave a well-deserved tribute to the resourcefulness and gallantry of the Nova Scotian miners in the tunnelling companies.

The vote of thanks which followed Lt. Morley's paper was not the merely perfunctory thing that sometimes follows the reading of papers. The modesty of his manner, combined with the sober reality of the scenes and occurrences he described — scenes in which many of those present were intimately interested because of the letters received from friends and relatives who had taken part therein—made Mr. Morley very welcome. The interesting details elicitited from the speaker during the discussion strengthened the belief that some valuable additions to technical practice will be the result of the operations of our tunnelling corps, who in the course of hazardous warfare undertook experiments in the use of explosives, and in mining practice generally that under our rigid mining laws could not be tried in civilian life.

COL. THOMAS CANTLEY,
President, Mining Society of Nova Scotia.

Lt. Morley's references to the magnitude of the shaft sinking operations was rather a surprise to his hearers. Mine shafts from 120 to 150 feet deep are first class operations in themselves, without any of the additional difficulties imposed by war conditions.

The Wabana Iron Ore Deposits.

The evening session of Wednesday consisted of a paper by Dr. A. O. Hayes of the Geological Survey on the origin of the Wabana Iron Ore Deposit, in Conception Bay, Newfoundland. Mr. Hayes's monograph on the Wabana Deposit published by the Mines Department at Ottawa is the fullest and most authoritative account of this remarkable deposit yet written, and as Dr. Hayes was to speak in New Glasgow, a community always deeply interested in the iron ore mines at Wabana, the Council issued invitations to a number of local residents, who were present in addition to the members of the Society.

The meeting was presided over by Mr. R. E. Chambers, the mining engineer of the Nova Scotia Steel & Coal Company, whose part in the development of the Wabana ore is not perhaps appreciated outside the circle of his associates. Colonel Cantley quite properly remarked "that for the knowledge we have of this valuable body of ore, and for its development, both the Dominion and the Scotia Companies, and the Province, owes Mr. Chambers a debt of gratitude greater than to any other man alive or dead."

Mr. Chambers briefly related his experiences from the time he first examined the Wabana exposures in 1893, and referred to the completion of the two main haulage slopes which now are handling the ore extracted from the practically unlimited submarine areas of the Nova Scotia Steel & Coal Co. at a distance of over two miles from shore.

Dr. Hayes described the deposit carefully and at length, with the assistance of excellent slides, but the most informative part of his talk was his references to the boring algae which seemed to have taken so prominent a part in the formation of the spherules which combine to make the oolitic hematite of which the Wabana ores are so largely composed. Many of Dr. Hayes's auditors were men who daily life was spent in dealing in one form or another with Wabana iron ore, and had doubtless not suspected the existence of the fairy-land of deduction through which Dr. Hayes led them. One begins to realize how hopeless it is for one man to compass entirely even one branch of applied science in these days, for in Dr. Hayes's short lecture he quoted proofs elicited by zoology, by petrology, by chemistry, by geology. How many sciences have been utilized to perfect the naturally colored micro-photographs of rock sections that were shown, who shall say? The net result of Dr. Hayes's remarks appeared to be that while he would not hazard the assertion that the boring algae were the real originators of the Wabana ore seams, these minute and fragile organisms played a prominent part in their deposition. Dr. Hayes intimated that he did not favor the replacement hypothesis, the inference of which

would be that the Wabana ore seams will be found to persist over the whole of the basin in which the original sediments were laid down, apparently under conditions of absolute quiescence.

Colonel Cantley in the discussion said the striking part about Wabana was the relatively small amount of ore in the land areas compared with the tonnages that are practically proved to exist under the sea. Colonel Cantley remarked:

> "The volume of ore is so great that it presents a new feature in mining, to this extent, that it will make practically no difference, not only to this generation, but to several generations to come as to what rate of extraction is carried on at Wabana."

Dr. Hayes made a suggestive statement as to a great similarity between the Wabana ores and those found in some parts of Nova Scotia, more particularly near Mira Bay.

The unique character of the Wabana deposit, the enormous quantity of ore known to exist, its relative importance in the world's markets, and its still greater relative importance as an Imperial asset, and the unprecedented distance from shore at which ore is being mined in the under-sea operations, are matters on which much could be written, and matters which were only touched upon in the evening's proceedings.

Visit to Allan Shaft Colliery.

The morning of Thursday the 24th was occupied by a visit to the Allan Shaft Colliery of the Acadia Coal Company at Stellarton, where the visitors were shown over the surface-plant by Mr. Notebaert, the mining engineer, and others of the Acadia Company's staff.

The Allan Shaft is equipped with what is probably the largest steel-bankhead in Nova Scotia, having a capacity to handle 4,000 tons of coal daily. The shafts are the deepest coal-shafts in Eastern Canada, being over 1,000 feet deep and brick-lined. The power-plant, boiler house, ash-handling equipment and other surface erections are of the most modern and efficient type, and have all been fully described in previous issues of this Journal.

Visit to Steel Works.

Following the visit to the Allan Shaft the members were taken to the works of the Eastern Car Company, visited the shipbuilding yard of the Nova Scotia Steel Company, where two 2,800 ton steel ships are now being built for the Canadian Government, and went through the Steel Works at Trenton.

The plant of the Eastern Car Company is large and of the most modern description, and the visitors must have realized that in a very short time and in a small radius, they were able to inspect a modern colliery, a steel-car works of the latest type, a ship-building plant, and a steel works which during the pressing times of 1917 and thereabouts saw 5,000 men and women turning out shells in extremely large quantities. and played also an important part in providing heavy marine forgings for the numerous "lame ducks" which made Halifax during war days. While small perhaps, compared with other industrial centres in Canada, there are not many places which can show so complete a microcosm of the coal industry, and its "homologues" if one may be permitted to use the term. For after all, every one of these industries is an outgrowth of the mining of coal.

Air Consumptlon in Collieries.

At the afternoon session a paper by Mr. John Casey, manager of Dominion No. 4 Colliery, was read in condensed form by proxy—in Mr. Casey's absence—on "Some Economies of Air Consumption in Collieries."

This paper was a valuable contribution, from actual experience, of the economies which are possible in the use of compressed air underground by using all possible checks against leaks, and more particularly by the use of an air-meter designed to record not only pressure values but actual quantities of air in cubic feet. Mr. Casey pointed out that friction in air lines was just as fruitful a source of friction losses as it was in water pipes, and that in extending the air system, sound judgment is required to allow for the proper pipe sizes and the keeping down of the velocity of the air to a minimum.

The use of an air-meter will detect air-driven machines, such as hammer-drills, "punchers" and other forms of cutters that are wasteful of air, and will oftentimes show that a new air-chest, or possibly a new machine, would be less expensive than the waste of air and loss of efficiency that more often than is suspected arises from worn-out parts or antiquated types of air-driven machines.

The loss of air and pressure from leaky hoses, and from leaky hose-couplings is another prolific source of complaints of insufficient compressor capacity. It is not the large and noisy leak that runs away with the compressor yield. It is the numerous small leaks, "bleeding" hoses, and wasteful tools which in the aggregate make many compressed air installations so inefficient.

The discussion which followed was a really worthwhile one, for it was participated in by men who had many years of intimate experience with air as a motive power, both in surface and underground operations, and in coal and iron-ore mining, and also in open limestone quarrying on a large scale.

Mr. J. S. Whyte, of the Acadia Coal Company, mentioned an actual experiment when the compressors were run on a Sunday with no pressure on the line, and no air being used. The pressure built up from nothing quite rapidly, but in about twenty minutes the pressure reached a maximum and the curve flattened. Though the compressor was kept running at full capacity, the pressure did not increase, so that a point was actually reached, with no air in use, when the entire capacity of the air-compressor was taken up by the leaks.

There is no reason to suppose that this experiment could not be repeated in many mines with similar results.

It was very evident from the keen interest shown in the discussion that Mr. Casey's paper had raised a topic of first-class importance. The matter is one which is of especial interest to Cape Breton collieries mining undersea areas. The only motive power we now know of that can be economically transmitted for five to seven miles from its source of origin, or entrance into the mine workings, is electricity, which is to-day looked upon as largely inadmissible because of its danger in the presence of inflammable gases. If electricity cannot be made safe for underground use in the undersea areas, then the undersea coal cannot be worked beyond a very limited distance from shore, but it is hardly necessary to admit at this time that man's invention will not overcome what is after all a matter of detail. One method in which electricity can be utilized will be to compress air at some point underground, sufficiently near to the working faces to enable the air to be utilized under conditions of

maximum efficiency to operate air-driven coal-cutters; and here those who favor the use of compressed-air will have an excellent field in which to demonstrate the possibilities of its efficient use. Indeed, if they cannot do this, they must yield the field to some other motive power.

The Pictou Coalfield.

A series of notes on the Pictou Coalfield and more particularly the part of that field contained in the areas of the Acadia Coal Company had been compiled by Messrs. J. J. McDougall(assistant to the Mining Engineer, and G. A. McHattie, surveyor, both of the Acadia Coal Co. and was read by Mr. McDougall. The completed paper will be forthcoming at a later date.

Mr. McDougall detailed the thickness of 18 seams of coal some of them 30 and exceeding 20 feet in thickness, which are present in the Stellarton section of the Pictou Field. The number and thickness of the seams in a comparatively shallow depth of strata is extraordinary, and certainly not paralleled elsewhere in Canada. An interesting statement to those who know the Pictou Field is that the presence of the Ford Seam has been proved to the north of the Allan Shaft within a hundred feet from the surface, but the actual outcrop has not been discovered.

The Pictou Field is a geological puzzle, the solution to which is probably not to be found from explorations in the limited area of the coalfield itself. The coalfields of Cape Breton, of Pictou County, of Springhill and Joggins, and of New Brunswick, including the possibly concealed coalfields lying to the south-west of the Springhill coal exposures, cannot be disassociated from each other in considering the problem of any one field. A study of the tectonic geology of the great Carboniferous basin of deposition which extends over a great part of New Brunswick, Nova Scotia, and the Gulf and continues far into Newfoundland, may throw light on the limits of the known coalfields, where these are obscured by the presence of newer overlying sediments.

Great interest attaches in New Glasgow to the persistence, or otherwise of the coal seams under the New Glasgow conglomerate, but while the explorations of the Acadia Coal Company have yielded valuable information on the internal structure of the Pictou Field, they have not thrown any definite light on this question. Boreholes have been put down in the Conglomerate, but the results were negative, particularly as they could not be tied up with known conditions because of the absence of intermediate boreholes.

Confirmation of Early Work of Logan and Hartley.

It was pointed out that the information obtained by the Acadia Coal Company's diamond drill boreholes was most striking confirmation of the accuracy of the work of Messrs. Logan and Hartley, who in 1869 reported the same number of coal-seams, from purely surface observations, that have to-day been proved by diamond bores sunk through the floor of an extensively worked seam (the McGregor seam). Naturally the particulars of the seams given by Hartley and Logan were not so exact as those revealed by the cores of a diamond drill, but when one considers the unknown character of the Pictou Field in 1869, and the unreliability of surface indications, the painstaking and conscientious nature of the work accomplished by these public servants of fifty years ago calls for some recognition.

More Mapping Needed.

Reference was made by several speakers to the out-of-date and inadequate condition of the geological maps of the coalfields, which have to a large extent remained as they were drawn by Hugh Fletcher. Dr. Hayes spoke of the accurate and painstaking work of Fletcher, a geologist whose memory needs no enconium to Nova Scotians. He mentioned the depleted nature of the Geological Survey Staff on account of the war, and while it was generally felt that during the war probably neither the men nor the money were available for the not absolutely necessary work of revising the geological maps, that in the past insufficient attention had been paid to Nova Scotia. Dr Hayes mentioned that the Survey was undertaking to map certain portions of the Joggins Coalfield (where a number of collieries are now operating), which have not been previously mapped. This is the district that the late Hugh Fletcher was engaged in mapping when he died.

The meeting was also pleased to learn from Dr. Hayes that Dr. Wight, Professor of Geology at Acadia University, was detailed to conduct investigations into the oil shales of Pictou County during the ensuing summer.

Mr. D. H. McDougall's Address.

The meeting, on the motion of Professor J. H. Sexton, which was seconded by Mr. C. M. Odell, passed a vote of congratulation to Mr. D. H. McDougall, past-president of the Mining Society, on his election to the presidency of the Canadian Mining Institute.

In replying, Mr. McDougall gave an account of the activities of the Canadian Mining Institute, and indicated the aggressive policy which the Council had outlined for the future of the Institute, particularly the intention of the Institute to become a factor in the framing of mining legislation. President McDougall also referred to the stand which was being taken by the C. M. I. and also the Engineering Institute on the question of inadequate salaries now being paid to public servants of technical departments. He also mentioned the suggestion which the Institute had made to the Federal Government to grubstake prospecting parties of returned soldiers, and the undertaking of the Institute to superintend the work of these parties. Mr. McDougall expressed his belief that the union between the Mining Society and the C. M. I. had been a proper and desirable thing, and that his own selection as President of the Institute was one result of the union, which generally had brought the members of the Mining Society of Nova Scotia into closer touch with the literature and movements now energizing the technical societies of North America.

Resolutions.

During the course of the Sessions a number of resolutions were passed. The Mining Society joined its forces to those of the Canadian Mining Institute and the Engineering Institute of Canada in the matter of technical salaries, it being resolved to

> "Respectfully urge upon the Dominion and Provincial Governments the pressing need of paying better salaries to those civil servants who are technical officers of the Department of Mines and similar services."

The following resolution was sympathetically received and passed, following remarks on the record of the Nova Scotians in the war from the President, Colonel Cantley, and from the past-President, Colonel Mc-

Dougall, who spoke in this connection as President of the Canadian Mining Institute. The resolution read:

"The Mining Society of Nova Scotia takes the opportunity of the first Annual Meeting following the defeat of our enemies to express its sense of the honor reflected upon the industries and profession it represents by the very gallant record of Nova Scotians on the fighting fronts.

"Our Society will keep in sacred memory those who fell, and desires to honor those who have so nobly served."

Following this resolution the Society very properly recorded:

"Its recognition of the duty of its members to assist in every way the re-establishment of returned soldiers in civil life."

Professor Sexton's Address on Repatriation.

In speaking to this resolution, Professor Sexton, whose work in the vocational training of disabled soldiers is so well known, said:

"I am glad this resolution has been moved. I find that the barometer of sympathy for returned men has lately been dropping. The greatest support we are getting is from the large industries of the Province. Soon after the declaration of war the Dominion Steel Corporation and the Nova Scotia Steel & Coal Company promptly declared they would take back all their enlisted men returned from overseas, and who had been on their payroll when they volunteered. I am glad to say they have lived up to this, and have even done more. I would like to state my appreciation of the contribution these companies have made to the rehabilitation of returned men."

Professor Sexton brought to the attention of the Society the necessity of vocational training for the cripples of industry, and the opportunity afforded by the existing organization which was working so successfully in refitting crippled soldiers for branches of civilian endeavor varying from their occupations previous to enlistment.

The consensus of the meeting was that Professor Sexton had opened up an important question with far-reaching possibilities, but a question that was itself in the process of development through existing agencies.

Amendments to Compensation Act.

During the progress of the meeting the Committee on Legislation reported on amendments to the Workmen's Compensation Act, which are proposed to be enacted during the current session of the Nova Scotia House of Assembly, and reference had been made to a proposal to increase the scope of the Act to include compulsory medical aid in all cases of accident. This will, if enacted, increase the disbursements under the Act by possibly twenty per cent., and while the present proposals contemplate medical aid for 30 days following an accident only, the implications of medical aid must eventually go much further. It was also mentioned that arrangements had been made to commence a Safety Council, under the direction of the Workmen's Compensation Board, empowered to make certain regulations concerning the safety of workmen, which if approved by the Board, will become compulsory upon all members of any given industry within the scope of the Act.

As there now exists at the collieries and steel-works of the Province and in many other industries, systems by which medical aid and hospital treatment is secured not only for workmen in the case of accidents arising out of their employment, but for the workman and his family also in sickness as well as accident, it was felt that while the matter was complicated, yet the existing benefactions and movements indicated a possible method by which some form of training could be extended to the cripples of industry, as it is now extended to the cripples of war.

A Committee was appointed to study the question raised by Professor Sexton and to report thereon to the Council.

The Committee named was as follows: The President, Colonel Cantley; the past-President, Mr. D. H. McDougall; the Vice-President, Mr. A. J. Tonge, of the Dominion Coal Co.; Mr. F. E. Lucas, of the Dominion Steel Company, and Prof. Sexton.

Majority of Meeting Favor Change in Name.

An echo of the Canadian Mining Institute Meeting was heard in a motion approving the suggested change of the name of the Institute. After some discussion a resolution was passed recording that "a majority of the members of the Mining Society of Nova Scotia present at the Annual Meeting in April, 1919, were in favor of changing the name of the Canadian Mining Institute to "The Canadian Institute of Mining and Metallurgy to "The Canadian Institute of Mining and desire to bind the individual members of the Society in voting through the letter ballot proposed on this question, and that each member would use his own judgment in voting.

The opinion of the meeting was overwhelming in favor of the proposed change of name.

A resolution of condolence was passed on the death of Mr. J. D. Maxwell, late the Assistant General Superintendent of the Dominion Coal Company, who was for many years past an active member of the Society and a Member of Council.

The proceedings of the Annual Meeting came to a close with a smoking concert on Thursday evening, when some really excellent singing, and some pleasant nonsense, concluded an enjoyable meeting.

Suggestions for Mining Institute Meetings.

The opinion of one who has attended both the meetings of the C. M. I. and those of the M. S. of N. S. is that the Mining Society has not suffered in its individuality nor in its virility by its union with the Institute, and possibly some improvements might be suggested in the Institute's form of annual meeting gathered from watching the proceedings of the smaller Society. The papers presented at the Annual Meeting in New Glasgow were few in number, but designed to evoke thorough discussion. The reading of the papers was not interrupted by outside attractions, and as the meeting took place in an "upper hall" at the top of three flights of stairs, the discussion was not spoiled by intermittent wafts of the animated gabble taking place outside which has so often spoiled the delivery and reception of a paper read before the C. M. I. on which the author had probably spent months, if not years of study and preparation. The writer has always thought that if the papers read at the C. M. I. Annual Meetings were fewer in number and more adequately discussed, without the usual interruptions, the annual gathering would be more useful from the technical side, although possibly it might lack in social attractions. As to this, however, one cannot be quite sure, because it may be that more people attend the meetings to hear the papers than has been popularly supposed.

The writer feels disposed to make an even more radical suggestion, namely, that no papers should be asked for the Annual Meeting of the C. M. I., but that a number of papers, limited to perhaps six, should be selected from among the papers read at the meetings of the Branches, for presentation at the Annual Meeting, and for discussion. Written discussion should be particularly sought, and in order to make this possible to the widest extent, the papers selected should appear in the Bulletin a month or more before the date of the Annual Meeting at headquarters. — F. W. Gray.

Canada's War Record

By COL. THOS. CANTLEY.

On the occasion of our last meeting at Sydney, May first, 1919, Col. D. H. MacDougall, in his presidential address, directed your attention largely to the subject of coal—its importance in the prosecution of the struggle in which we in company with the other portion of the Empire were then engaged, and its influence upon the National life of Canada. In view of the fact that since that date the arms of the British Empire and our Allies have been crowned with victory—our foes having on the 11th November, last, cried, "enough", and accepted armistice conditions which in effect ended the war so far as they were concerned — I think it now fitting at this the first meeting of the Mining Society in a new era after four and three quarters years experience of war conditions, that your President with your permission, direct your attention to what Canada has done in the Great War, its cost to the Dominion in men and money, the effect produced on our people, the conditions arising out of the War, and how we may best meet these.

As to the Dominion's part in the Great Struggle, some idea as to the development, extent, and cost of our effort may be gathered from the following figures:

	Number of men sent overseas.	Expenditures.
1914	30,999	$ 25,275,749.
1915	84,334	127,616,300.
1916	165,555	248,665,770.
1917	65,536	515,094,895.
1918	73,630	360,000,000.
	418,052	$1,076,756,714.

From the figures just quoted it is shown that up to November 15th we had sent overseas 418,052 men. Of this total it is estimated that some 6,000 coal miners enlisted from Nova Scotia. Surely a very creditable record — and altho some may doubt the wisdom of the authorities in permitting so many skilled men to enlist, the spirit and patriotism of these volunteers is beyond question.

The losses in the Canadian Army for the same period amount to 218,433 and 52,176 were killed in action or died of wounds. Reviewing some of the more illuminating details it would appear that Canada's participation in the Great War up to November last had cost One Billion dollars. Of this amount more than half, or to be exact, $567,540,000 represents pay and allowances. For the maintenance of our Army in France we have paid out $114,367,000, Separation allowances called for $81,470,000 — the clothing for the Army has cost $57,000,000 — boots and repairs, $11,333,000. To transport our army across the seas we paid $17,815,000, and the land transport cost $19,112,000 — horses and remounts $6,594,000, machine guns, $4,494,000 — outfit allowances $11,622,000.

The average cost of rations per man in Canada was fifty cents and in Great Britain, .38½ cents per day. The average pay to our soldiers was about $1.25 per day for all ranks. The cost per man for clothing is about $64. per year, to which about $5.00 is added for necessaries. Upkeep has been placed at $20. per man per month. On the 31st October, 1918, there were 90,000 families of dependents of soldiers in Canada who received an average of $33. a month for all ranks—this by way of separation allowance. The maintenance of our men in France worked out at about $2.50 per day—this includes everything.

History has been enriched by the record of Canadian arms. How proudly we recall the immediate response to the Empire's call for men, when over 33,000 Canadians volunteered, went into training at Valcartier in August and on September 25th, 1914, embarked for overseas, arriving safely in England October 16th. In the early days of February 1915, they crossed to France, and soon took their place in the front lines as an integral part of the British forces. What a thrill of pride went thru all Canada a few months later at the wonderful stand of the Canadians at the Second Battle of Ypres, where the Hun first used gas, and when the Canadians held the broken line against overwhelming odds, and saved not only the Channel ports for England, but also saved the British Army from a military disaster. Month by month the Canadian army steadily grew in strength, always adding fresh lustre to its proud record. Langemarck, St. Julien, Courcelette, the Somme campaign, the storming of Vimy Ridge, Passchendale, the breaking of the Hindenberg Line, the capture of Cambrai, Amiens, and finally the dramatic entry into Mons at the closing moment of the war, all have added to Canada's fame, and it is our Army's proud boast that Canadians never failed to capture their objective.

Of their exploits and individual bravery much has been and more will be written. Their activities have extended from France and Flanders to the Archangel and Vladivostock fronts in Russia. Canadians participated in the Dardanelles campaign, others were in Mesopotamia, Medical units and our airmen assisted in Egypt, and wherever the need was geatest our men were found. For their gallantry already 55 Canadians have been awarded the Victory Cross, 513 the D. S. O., 1882 the Military Cross, 1,188 Distinguished Conduct Medals, and 4,697 received the Military Medal. Canadians were mentioned in despatches on 3,333 occasions, and won numerous foreign decorations. We can also point with pride to the fact that nearly if indeed not more than 200 Nursing Sisters were awarded the Royal Red Cross.

Canada in her participation in the great war literally found herself. Not only did we as citizens of this great Dominion rise to a higher conception of our individuality as a Nation, but demonstrated our place as one of the chief Dominions in the greater Empire that the world has ever known. We also won the unfeigned admiration not only of the world in arms, but also of the great brotherhood of world wide nations who with few exceptions were one in the conviction that the military conception and purpose of the Central Powers must be utterly destroyed. While it is true that our neighbors of the Republic to the south for several years did not join us in what for a considerable time seemed to them at least a doubtful conflict, the great majority of their better citizens secretly, and many of their most prominent men, openly, expressed their admiration for the instant action of Canada in springing to the defence not only of the Empire, but of civilization, and applauded the energy and determination with which so small a people ventured all for what they conceived to be the right.

As to the people of Canada, who can measure, who can determine or set bounds to the moral and national uplift which came to us thru the participation of their sons in this great conflict. More than 400,000 of the youth and vigor of Canada went from our shores, all of them having counted the cost, and most realizing that they would soon be engaged in a war waged by methods more destructive, more deadly beyond all parallel in past history, and opposed by a foe who resorted to methods not only deadly but detestable, and even diabolical beyond human experience. Despite all this they went forward with a smile and a joke, and today 60,000 of them lie in lonely graves not only in France and Flanders, but on the shores of the Dardanelles, in Egypt, Russia, and many in the old home land. Over 218,600 have been wounded, and more than 30,000 are still in hospitals in Great Britain, France or Canada, and when all will have been demobilized, Canada will have a number more or less maimed and permanently disabled exceeding that heroic vanguard of 30,000 who sailed from Valcartier, October 1914.

These men, our returned soldiers, who have participated in the struggle, who have seen all its horrors, the wastage of life, the wanton destruction of homes and property, and have borne uncomplainingly in some cases for years, conditions of existence, of which we at home have no conception, have given the best years of their lives that we Canadians might continue to enjoy what we so often glibly and without understanding its cost, refer to as "liberty". To these men and to those who have fallen, the Nation and particularly this Dominion, owes a debt of gratitude beyond computation. To those who still live, and for the parents and friends of our heroic dead, the greatest reward must be the consciousness of having done their part, and contributed their best to the winning of the freedom of the world. We who have not been combatants but remained quietly at home must remember that we owe much, and that obligation we must recognize and discharge as best we can, and in the spirit and so far as it is possible, in measure equal to the service and sacrifice which our returning men so spontaneously and so gloriously rendered on our behalf.

Conditions Arising Out of the War.

When an economic period, measured in this case by nearly five years, suddenly ends, and the world is brought face to face with wholly opposite conditions, a period of uncertainty and confusion is bound to follow. Many predictions are more or less fulfilled, but often in unexpected ways and with unexepected immediate consequences. Some things which we thought would certainly follow do not occur, or if they do, the result is often opposite to what was anticipated. The effect is bewildering and a comprehensive grasp of the situation is impossible. This conditions of affairs is not new, but has marked the immediate close of every great war. As by comparison the war which began in August 1914 was from every point of view the greatest that history has ever known, it is natural, on reflection, to suppose that the dislocation of commerce and trade, and the readjustment and return to normal conditions must present corresponding difficulties, and require a corresponding period in which to effect complete readjustment.

We are now emerging from the artificial conditions of war, during which trade and industry, politics and legislation, and the habits of our people have been more or less run in new and unfamiliar channels, and in most cases not to our liking. Our instincts are to get back as quickly as possible to former ways. In the doing of this, however, we encounter many obstacles. At first thought it would appear that the abnormal high war prices, which were the result of the war itself, and war time requirements (enhanced by lack of transport) would immediately disappear with the cessation of hostilities, that the disbanded armies would return to productive work, and that instead of a shortage of labor, the world's demands for curtailed supplies of manufactured goods of every description would provide occupation for all our workers, but the fact is that to quickly adapt industrial plans and activity to after-the-war altered conditions is difficult and complex.

High prices have stimulated certain manufacturers and made possible the marketing of certain raw materials at points and under conditions which can no longer be carried on at a profit. War time prices were not merely a cause, but in many cases, the effect of was time advanced wages — but wages do not come down relatively to the decline of prices. Prospective buyers are waiting and will continue to wait until convinced that automatic readjustment has carried prices to the lowest or nearly the lowest point. The question of wages, therefore, is not merely an industrial but also a social problem.

Such transition period past history has shown to be always a trying one, and our experience will be no departure from that of the past. It is no exaggeration, to say that the result, or up to the present, the lack of result, of the deliberations of the Peace Conference has been a great disappointment everywhere, and in provoking feelings of resentment which are not confined to the manufacturing or working classes, to the shipping or the agricultural community, but is wide spread throughout the world, and that for good reasons. The general view of the duties of the Peace Conference was that at the earliest possible moment, and with the least delay, and ignoring all extraneous questions, they would determine the terms of peace with Germany, and Germany's allies, such terms to include the amount to be paid by them towards the loss and cost of the war to the Allies, together with the territorial rearrangement due to the altered conditions resulting from the war, and the enforcement of adequate physical restrictions upon Germany, which would prevent that country reaching a

position where it could be a menace to the peace of Europe within the life of the next generation.

Unfortunately there is too much reason for concluding that other considerations than these have more or less governed the deliberations and protracted the work of the Peace Conference. The time has been wasted in the discussion of academic theories and illusionary suggestions by which it is asserted continuous world peace might be secured. Ideas put forward by visionaries who have forgotten, if indeed they ever realized, that man has, as all recorded history proves, always been a pugnacious animal, with a latent unrest, looking forward to and reaching out for a better and more satisfactory adjustment of physical needs and physical possessions. While it might be going too far to say that all human material progress has been the outcome of war, it can at least be safely asserted that much af the material advantage and comforts arising out and enjoyed by civilization has been the result of past wars.

The world as a whole at present has had its full of fighting, is sated with slaughter. A large part of the civilized world today is in mourning — all the warring nations are more or less exhausted physically and economically, and are disposed to cry out "enough". But given twenty or thirty years of peace, with war debts paid, the British Empire, France and Germany again prosperous, Russia returned to civilization, Japan enormously grown in power and wealth, China and the East having found themselves, with a new generation of men governing the world who will know the horror of war only through history and tradition — men of like passions, like hopes, like aspirations, and like desires as ourselves, what League of Nations will prevent, and how far, think you, will decisions arising out of the generalities and resolutions of a war-weary world then restrain or control any of the world powers of that time, who for causes then pressing on them, determine to emancipate themselves from conditions which they consider intolerable? Or who on the other hand, as did Germany in 1914, may decide to extend their influence and better their position by an appeal to arms. Abstract theories, be they ever so virtous, have not sufficed in the past to keep of the world, and will not in the future. Reliance on, not scraps of paper, but on adequate military training and ability to defend ourselves, is the only proven safeguard against loss of liberty.

Practically the condition today before us as Canadians is as to how we can the earliest, the most certainly, and with the least cost, return to normal economic conditions, pay our vast accumulation of war debt, and bring plenty and contentment to the people of this Dominion by providing employment for all our workers be engaged in mining, agriculture, fishing, manufacturing, or commerce. There is a disposition on the part of many to think that all this can be accomplished by Governmental authority — these men forgetting entirely the functions of Government.

In our judgment the first thing necessary is the removal of all Governmental control arising out of the war, or imposed on us on the pleas that such was necessary for the proper prosecution of the War. Included in this is the release of all requisitioned shipping, the readjustment of taxation, on such a basis as will provide the amount necessary for the carrying on of the Government, meet the interest, and provide a sinking fund which will retire our War Debt not within ten or fifteen years, but say forty or fifty years hence.

Much has been heard and more written on the subject of Reconstruction, both at home and abroad. Social reformers have vast schemes of re-employment, better housing, the so-called Whitley and other schemes for labor co-operation in marketing and distribution of commodities, nationalization of transportation, of mines, and of other sources of raw material. These in the main are discussed and advocated by people in academic life or habit of thought, men devoid of all practical experience in business or commercial life, but whose self-conceit is thereby none the less diminished, but who on the other hand, are quite convinced that they are competent to advise and direct the commerce of the country at the most difficult crisis in history.

In some circles great hopes are held out as to extensive markets being found for our manufactured goods in the devastated regions of France and Belgium. The active head of the American Red Cross Construction work in France is reported as stated that that country would require 80,000 ploughs, 56,000 cultivators, 39,000 mowing machines, 115,000 farm waggons, 88,000 harrows, 50,000 rollers, 36,000 seed drills, 13,000 fertilizers, 16,000 horse drawn rakes, 32,000 reapers and binders, and various other farm implements. We have no means of knowing as to the correctness of these figures, the sources of information available to or capacity of those who give them. Neither have we any information as to whether all this agricultural machinery is required during the present year or over a period of years.

Other estimates have been made and published as to the enormous amount of reconstruction material required for the rebuilding of devastated areas in France and Flanders. People not lacking in imagination, but possessing that characteristic in a greater degree than knowledge or judgment, have assumed that these two countries will buy from Canada and America during the coming year, more manufactured goods than we are probably prepared to supply, or at any rate than we can find transport for. Now France and Belgium will both require considerable quantity of sawn lumber, also certain raw materials such as cotton, coal, leather, pig iron in limited quantities, and some steel. Of course considerable quantities of food, cheap clothing, and a very common type of furniture in a knock-down condition, will also be wanted. Beyond these the requirements of France and Belgium are few, which need not be surprising when it is realized that these countries have their own problems of providing employment for their demobilized armies, coupled with the fact that that they have not the money, nor can they easily obtain the credit, if they wished it, for large importations. Their expressed intention is to provide employment for their own people, first, by manufacturing their own requirements and, second, so far as possible, by supplying the world's market with such products and goods as their resources will permit them to supply. Further, the ruined cities and towns of devastated France will not all be rebuilt either during this year, or even within the next five years.

It is a self-evident fact that if Canada is to pay the interest on her debts, raise the amount necessary for pensions and so keep faith with her illustrious dead, and returned broken men, and also maintain the ordinary public service of the country, the Government must be provided with an amount of money practically three times that contributed by Canada in pre-war days. This can only be done by a large export of agricul-

tural and manufactured products, and while we must look to Europe to absorb our agricultural products, it is not in that direction we should look for a market for the great bulk of our manufactured goods, but rather to our sister Dominions, the islands of the West Indies, and the Republics of South America, to supply which the transport charges should not be greater from Canada than from Europe, and where we can meet the manufacturers of Europe on practically equal terms. This can only be done by complete freedom from Governmental control of business, and from subserviency to class interests, whether it be that of labor, agricultural, or capital. The financial policy of Canada must be such as will raise sufficient revenue without an abnormal tax on invested capital, without which industry is impotent.

Economic laws will soon automatically lower prices of both food and commodities, and with a lower cost of these must come a lowering of the wage scale, which all Governments so generously advanced during the war times now past.

The solution of the labor troubles will perhaps best be met by the recognition by both capital and labor that a spirit of reasonable accommodation must prevail — that leadership must be recognized, and that conspicuous ability, be it among manufacturing managers or industrial workers, must be rewarded on a different scale from that of mediocracy. A broad minded policy on both sides which will learn to be fair and firm in essentials and also complacent and generous as regards non-essentials. These we suggest as some of the requisites for a return of properity to Canada, which we fully believe will soon enter upon a period of development and expansion greater than anything we have yet seen — great as that has been — for though much has been accomplished the greatness of the Dominion is still practically potential, and Canada is still of all countries par excellence the Land of Opportunity.

BELMONT SURF INLET MINES, LIMITED.

A report covering the ten months ending 31st December, 1919, has just been issued by the Belmont Surf Inlet Co., Ltd., operating mines at Surf Inlet, B.C. The net earnings of the company amounted to $323,242. The report also states that a loan made to the Company by the Tonapah Belmont Development Company amounting to $1,295,726, and interest has been repaid.

The average metal content of 83,142 dry tons of ore milled was 0.421 oz. in gold, 0,3114 oz. in silver and 0.2606% copper per ton, giving a total value of $924,847 or $11.12 per ton. The ratio of concentration is 11.09 to 1, which gives 7498 dry tons of concentrates having a gross value of $854,537.20 or an average value of $113.97 per ton.

Gold, silver and copper were sold at an average of $19.74 per oz., 97.13 cents per oz. and 20.957 cents per lb., respectively. Operating costs amounted to $7.185 per ton, the net realization being $3.888 per ton or 35.1% of the gross value of the ore. Mill tailing losses were .846 per ton.

Mining costs, which are especially interesting at the present time, show stoping to have cost $2.22 per ton, development work $0.361, milling $1.278, flotation royalties $0.116 and administration and taxes $0.614 per ton. The total operating costs being $4.83 per ton. Loss on boarding and bunk houses $0.182 per ton. The costs of drifting 893 feet, cross-cutting 241 feet, and upraising 753 feet were $16.41; $16.26 and $13.215 per foot respectively. The average cost of the 1887 lineal feet of all development work was $15,116 per foot. Each foot driven yielded 4.18 tons.

Operating costs were seriously affected by advanced prices paid for supplies and by the abnormally high labor costs. High wages, however, did not improve the low efficiency of the labor.

Ore reserves are calculated to be 422,761 tons or an increase of 153,790 tons since March, 1917.

New ore development was satisfactory although development work was less than the advisable minimum owing to labor shortage.

Milling operations fully met expectations for both efficiency and economy, 93.7% of the possible operating time, namely 13,818 hours the concentrator ran continuously, milling 272.6 tons per day, although over 300 tons per day have been milled since the end of the year.

Concentrates amounting to 6,374 dry tons were shipped to the smelter yielding $780,775.02 and 1123 tons of concentrates valued at $73,762.18 remained unshipped owing to a difficulty in securing steamers.

The hydro-electric plant gave excellent results, 4,737,360 kilowatt hours being generated with 4,394,525 k.w.h. delivered or a loss of only 7.37% in lines and transformers. The cost of producing the power was $9,966.78 or $1.23 per horse-power month.

Construction of houses for employees, a store and school-house was undertaken at a cost of $45,569.77.

A dividend of 5% or 5c per share was paid on 15th April, 1919.

PORTLAND CANAL ATTRACTS ATTENTION.

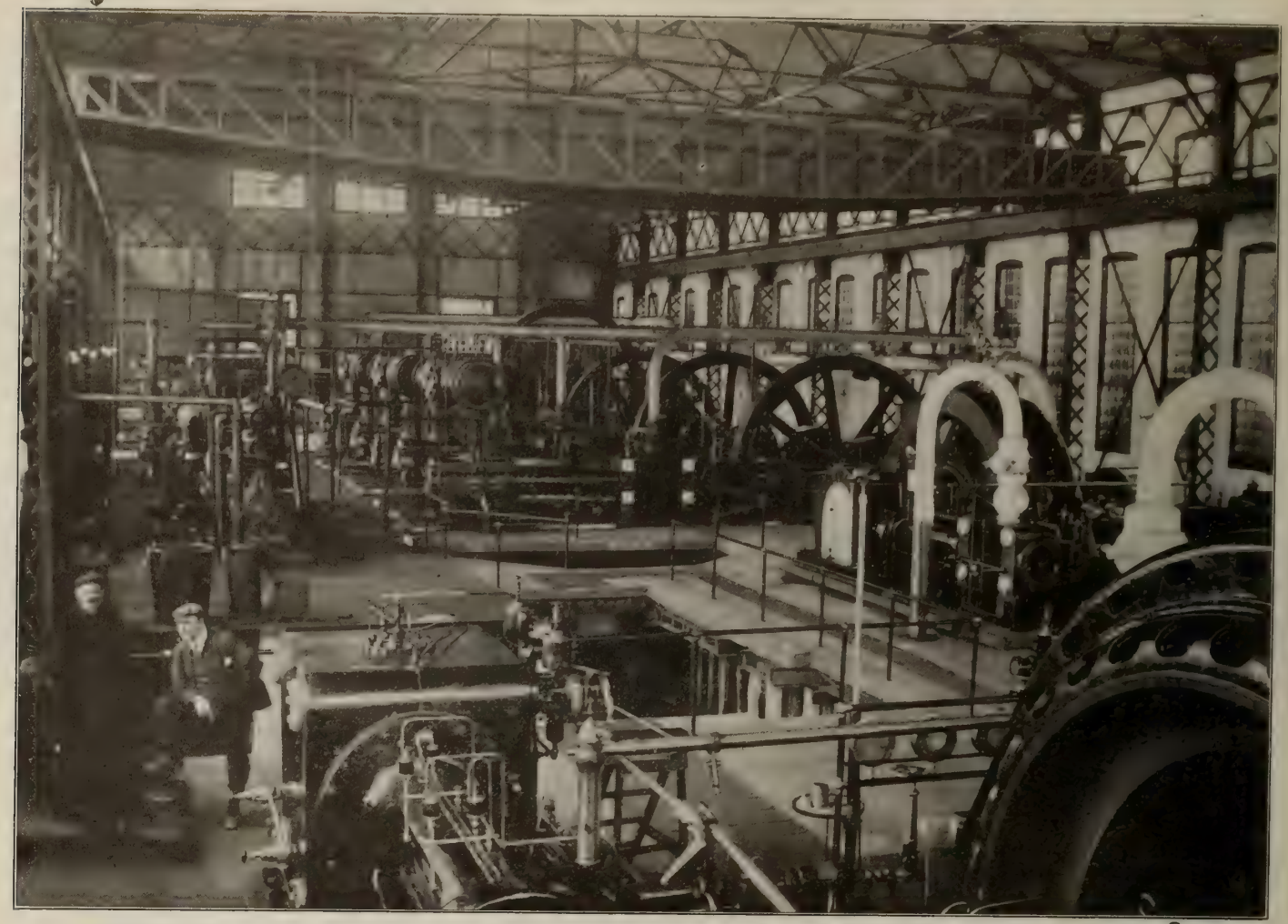
Attention continues to be commanded by Portland Canal, B.C. The Premier Mine, Salmon River, shipped 204¾ tons to the Tacoma Smelter, and the gross value returns were $67,483.55. The Premier formerly was known as the Bush Mine, and is owned by R. K. Neill, of Spokane, and Messrs. Woods and Trites, of Fernie, B.C. Several important mining deals have taken place recently in which Portland Canal properties were the issue. New York men, for instance, are said to have acquired a considerable interest in the Premier or Bush mine. The Forty-Nine and Yellowstone Groups have been bonded to C. F. Caldwell for $125,000. The Silver King Group, adjoining the Joker, has been bonded by O. B. Bush, of Vancouver, for $100,000. Mining properties now working in the Salmon River section are the Premier, Mineral Hill, and Joker. Work will commence about July 1 on the Big Missouri, recently bonded to Sir Donald Mann, the Yellowstone, Bush Mines, Forty Nine and Silver Creek. With a considerable number of prospectors going into the country this summer, and with operations under way on the properties enumerated, not to overlook the road and wharf construction which the Government plans, the Salmon River district should be the scene of much industry during the next few months. Mr. Caldwell, who speaks with unbounded enthusiasm, of the possibilities of the new camp, expresses the hope that the Government will appreciate the need of a railroad to open it and to aid in the development of its mineral.

"Princess" Colliery of the Nova Scotia Steel and Coal Company, Sydney Mines.

Blast Furnaces and Coke Ovens of the Nova Scotia Steel and Coal Company, Sydney Mines.
—Photo courtesy Mines Branch, Ottawa.

No. 17 Colliery, Dominion Coal Co., Nova Scotia.

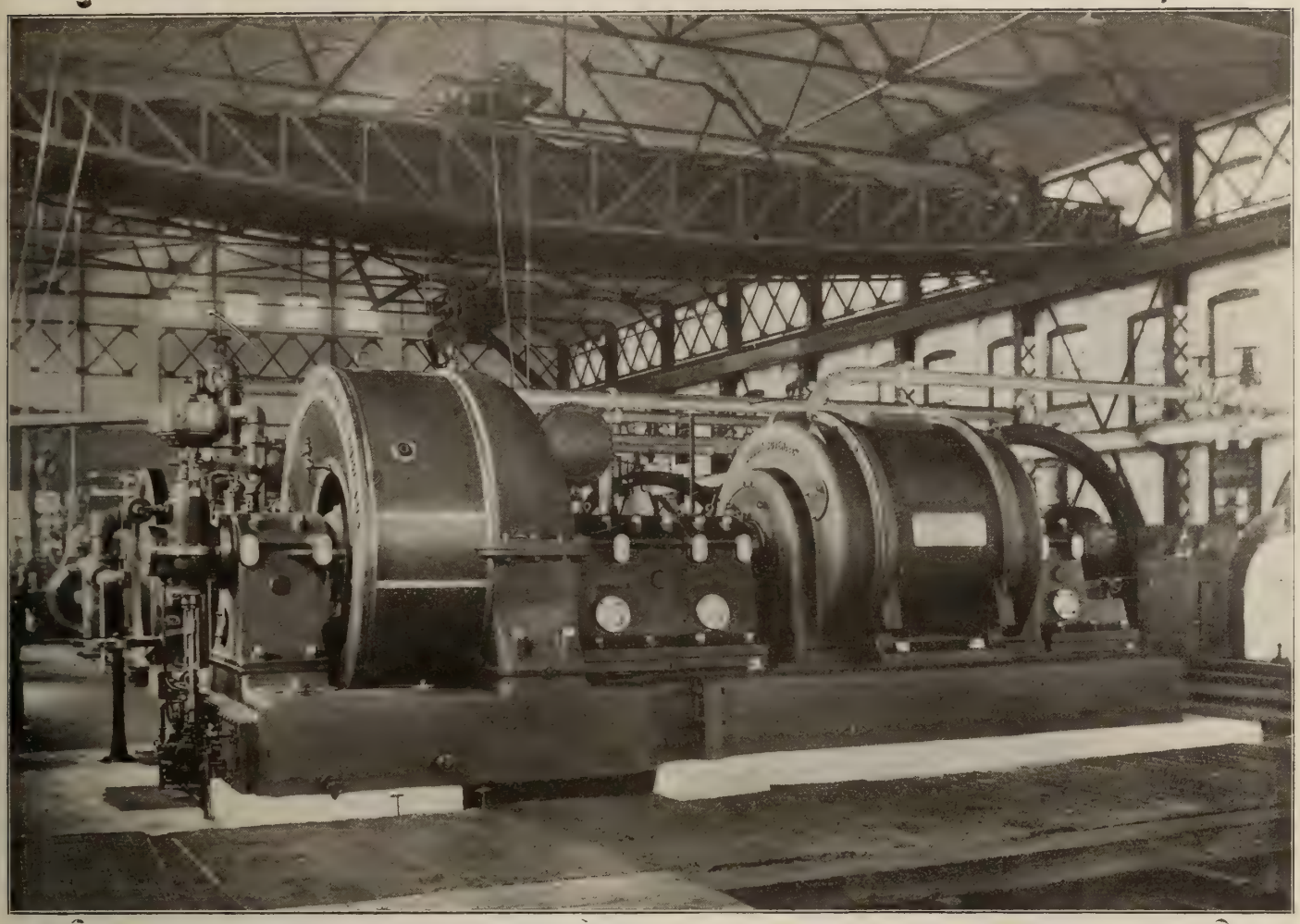
No. 2 and 9 Collieries of the Dominion Coal Company. Two Coal Seams Are Worked at The Mine to Contiguous Shaft.



Interior of Power House No. 2 Colliery of the Dominion Coal Company, at Glace Bay, N. S., Showing Air Compressors and Electric Generators. (The Unoccupied Space in the Centre of the Floor is Now Occupied by the Turbo-Generator Set Shown on the Opposite Page.)

No. 12 Colliery. Dominion Coal Company.

—Photos courtesy Mines Branch, Ottawa.



Electric Turbo-Generator Driven by Exhaust Steam Turbine. Dominon No. 2 Colliery, Glace Bay.

No. 14 Colliery, Dominion Coal Company, Showing Electric Hoisting Engine House at Rear of Bankhead.

Joggins Mine. Maritime Coal, Railway, and Power Company, Cumberland County.

No. 4 (Caledonia) Colliery, Dominion Coal Company.

—Photos courtesy Mines Branch, Ottawa.

Tunnelling on the Western Front

By LT. GEO. H. MORLEY, M.C.

The object of this paper is to give a general idea of the work of Tunnelling Companies in the last war.

Tunnelling was first recognized by the British as an important arm of the service in the middle and latter part of 1915, when a call was sent to all units for men and officers with mining experience in civil life to volunteer to serve in this new kind of warfare.

Large number of miners from all parts of the world —Cape Breton being well represented—came forward, and what was known as the Brigade Mining Sections were formed and the work of stopping the Boche underground was started.

These units were not properly organized and were not given the support necessary to compete with an organized, fully equipped and prepared enemy; consequently the Boche held absolute control of the mining situation up to the beginning of 1916.

It was then that the Tunnelling Companies were formed, organized and fully equipped in every detail. These Companies started with an establishment of some five hundred officers and men, had their own transport, blacksmith, carpenter and repair shop; in fact, were complete in themselves.

This establishment was sufficient at the start, but as the work undertaken grew, and the underground systems became extensive, it was found necessary to add to the strength from time to time, and toward the end most Companies had a total of anywhere from ten to twelve hundred all ranks.

The work, in the beginning, was started from the makeshift systems of Brigade Mining Sections. These systems served the purpose of keeping the Hun checked, to a certain extent, until such time as the new companies were able to sink large new shafts, at greater depths than had been previously attempted, and push forward new systems with a definite plan of action. These systems consisted of: 1st, Shafts sunk at depths of anywhere from 16 to 120 feet at varying distances along either the front or support line trenches. 2nd, From the shafts a large gallery, generally 5ft. by 3ft. was driven out towards the German front line for a short distance, as a rule 10 or 20 feet in front of our lines. From these large galleries, smaller ones, 4ft. 3in. by 2ft. 3in. were broken off to the right and left and driven to parallel our trenches.

The parallel galleries were for defensive purposes only and were generally connected up with the galleries of the shafts on both flanks, forming a complete barrier against any enemy offensive mining and at the same time affording several exits for the men below in case of any shaft being wrecked by the enemy artillery.

At intervals of roughly sixty feet listening posts were driven from the parallel galleries towards the German lines. The listening posts were "Feelers" pushed out until they came in contact with the Hun. In these posts men trained in listening underground listened for sounds of enemy mining. If sounds were heard it was from these posts that the task of stopping his work and pushing him back was undertaken. It was in this line of work that the British miner proved his superiority. In the first place we must remember that the German not only had his systems well across No Man's Land when we started, but in many places had his offensive galleries well under our trenches, waiting the opportune moment to blow and start his big push forward.

The Reason for Deep Shafts.

Our problem was: How can we pass his systems, and get ours well out without fighting every inch of the way with great loss of life and material.

The obvious thing to do was go deeper. Up to this point all operations were carried on near the surface, the greatest depths being roughly twenty feet. The difficulty of going below that was due to a layer of quicksand varying from fifteen to thirty feet. Both sides found it impossible to sink a shaft through this sand with the material and plant supplied.

We tried piling through time and again and managed at some points to get down to the firm blue clay; but so much water came down continually that all our time and attention was taken up with the problem of keeping the water in check and very little work was accomplished.

Water Tight Steel Shafts.

Next we tried to jack down a water tight shaft through the quicksand into the blue clay, taking the muck out of the shaft after it was down in position and set. This proved to be very satisfactory and it was on this principle that all shafts either timber or steel were sunk afterwards and we were able to mine at any depth we wished.

Driving Under Hun Galleries.

Galleries were pushed ahead generally at two depths. Sometimes as many as three levels were driven from the one shaft, the two upper being defensive saps, the lower an offensive.

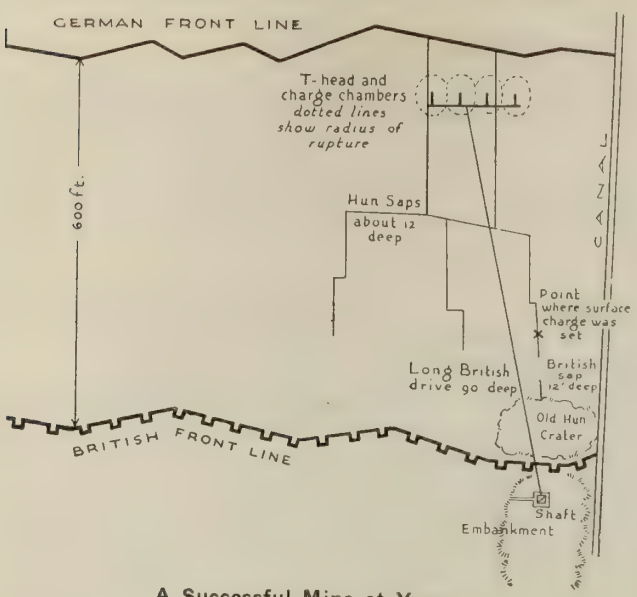
In this manner we drove under the Hun galleries, far enough below to work without being heard by his listeners, rising as we advanced, and in time our sapheads were driven close to his front line. With the use of the geophone—a very sensitive listening apparatus, on the principle of the stethoscope by very careful listening our listeners were able to locate the position of the enemy saps. We then carefully and quietly drove a post towards where we judged these enemy saps to be, made sure of the distance above and the exact location of his sap and placed a charge sufficient to wreck his gallery at that point, thereby cutting him off from the forward and main part of his system. If it was thought advisable we would drive into that forward part of his system, occupy it and work it as part of our defensive scheme.

A Successful Coup.

Below is a rough sketch of one highly successful coup planned and carried out by the 1st Canadian Tunnelling Company.

When the First Tunnelling Company started operations on this front (The Bluff, South-East of Ypres), the Hun had eight months start, sufficient time to mine our front line and have a complete defensive system prepared.

Shortly after we started operations; we found he was consolidated in every sense of the word. As the



A Successful Mine at Ypres.

plan shows. We found this by running a shallow sap from the outer rim of one of his old mine craters towards his line.

After we had driven a short distance the Hun blew; wrecking most of the gallery and killing the crew working at the time. We then realized that we were up against a proposition that required the greatest care and skill to accomplish the task set us.

We then drove ahead cautiously and slowly until we got to a point where we considered it wise to stop for the time being. Meanwhile we had sunk a shaft well to the rear of the front line and drove a sap, ninety feet below surface, towards the Hun. At the same time we carried out an extensive listening programme on the surface at night in No Man's Land and located the Hun system to be between 10 and 15 feet. We then placed a small charge of 25 pounds of ammonal on the surface in No Man's Land, directly over the point where we thought his gallery passed, and exploded it. This sprung a hole in which we placed a charge of 100 pounds that in turn was exploded at night, crushing his gallery below.

We immediately drove ahead from our shallow working and captured some thirty feet of Hun sap which we converted into a defensive gallery and held the German in that position. By this time our deep gallery had been driven quite close to the Hun front line, directly under the point we judged his main gallery passed. We then T-ed off, or drove a post to the right and one to the left, the total length of the two being roughly 160 feet. Four chambers were put in at fifty feet intervals and charges of 600 to 800 pounds of ammonal were placed in each chamber and exploded, cutting any galleries that passed across the T-head.

From the captured portion of the Hun sap we drove ahead as fast as possible and in a little under four hours we broke through into the Hun System and captured the whole thing complete with tools, listening devices and dead sappers.

We gained a great deal of information about Hun methods and appliances and found that all were inferior to ours at that stage of the game.

I might add that this put an absolute stop to Hun mining on this front and that great credit is due to Major North, O. C. of the Company, and Captain Roy Spencer, officer in charge of the work. Both are Nova Scotians as were most of the men who played their part so bravely and devotedly in that "Little Show."

Men Liked Work in "Offensive" Galleries.

Defensive mining was only one of the many lines of work which the Tunnelling Companies had to undertake.

The one ambition of every Tunnelling Company was to drive an offensive gallery, and if authority was granted to a Company to drive one, it was the one ambition of every sapper in that Company to work on it, and the sappers that were chosen to work there would show the same interest in it that a mother does for a sick child.

When those men came off duty the one topic of conversation would be "The big job," guesses would be made and bets laid as to the number of feet the following day's progress sheet would show, the date of completion, the number of tons to be placed in the charge, and what a poor unfortunate, miserable wretch the Hun was; and what a cute little prize packet they would hand him on "Der Tag"—Ourtag!

Such a thing as failure was unheard of. They did not know, and refused to recognize the word. Hadn't everything they'd undertaken proved successful? Had the Hun beaten them anywhere? The Hun had the wrong idea, the wrong spirit, the wrong breed of men to beat them.

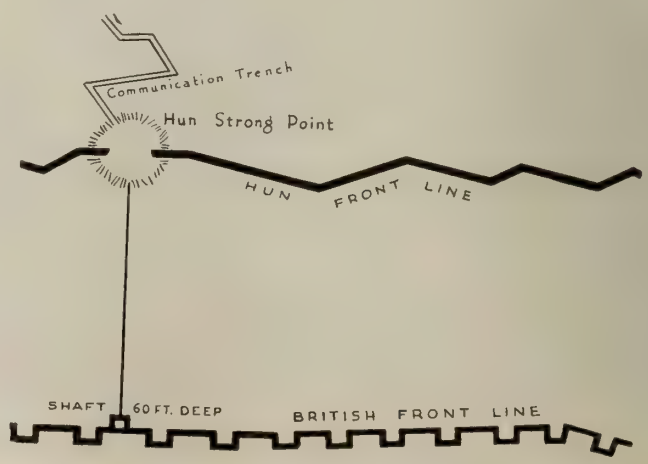
Confident, they were over confident possibly, but this was the spirit that overcame innumerable difficulties, that drove the Hun out of No Man's Land underground, made that part of No Man's Land British. The same spirit eventually drove the Germans to the German side of the Rhine.

As a rule defensive saps were driven at the same time as the offensive, and at times what was intended for an offensive sap had to be turned into a defensive or righting sap, due principally to running into a Hun defensive or offensive system.

There was one good example of this on the St. Eloi front.

A Problem on the St. Eloi Front.

An old R. E. timber shaft was used, as this was to be a surprise blow and time was a big factor. The shaft was sixty feet deep, deep enough to serve our purpose, but there was one drawback, and that was water. Water poured in continually from an old caved-in-system that had been driven from the shaft on a thirty-five foot level.



The distance from the shaft to our objective, a decidedly strong point at the head of a communication trench, was two hundred and thirty feet. We managed to drive 200 feet when the Hun became suspicious and started to bore large holes from his front line to a depth of anywhere from 30 to 50 feet. He placed heavy charges in these holes and exploded them, hoping by this searching method to blow one over or close enough to our gallery to wreck it. He blew three times.

Explosion Causes Flooding.

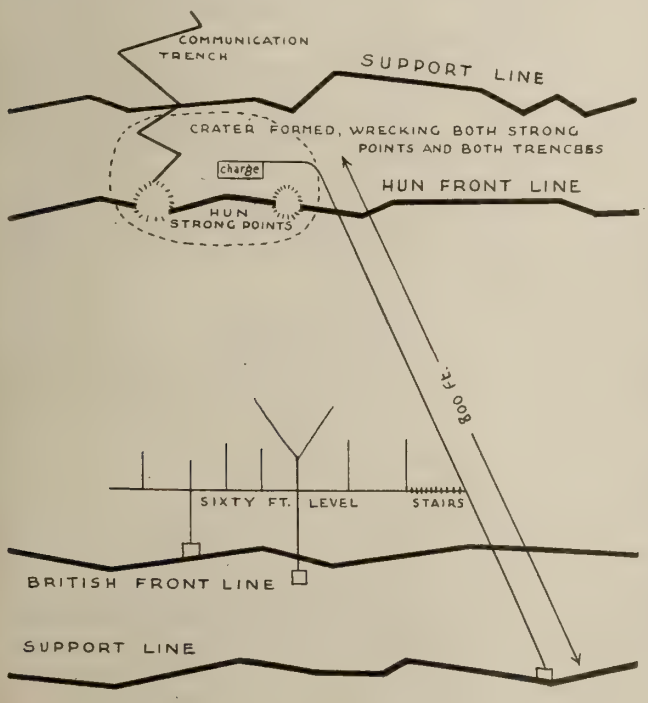
The first time he blew he crushed several timbers and pinned the two men at the face. The next blow was distant and did no damage. The third was a long way down his trench and under ordinary circumstances would have been perfectly harmless, but an extraordinary thing happened, the blow let in a small body of water through the old system on the high level, necessitating the withdrawing of the men and the lowering of two extra pumps.

All hands came on top and the first pump was lowered to the pump landing and a man just started down the ladder to set it up, when a deep roar was heard, and in less than two minutes the whole gallery and half the shaft was filled with water. This water came in from the old workings on the high level, it had evidently been dammed by a small cave-in and the jar of the third blow loosened the dam, let in the first bit of water which paved the way for the second and large body.

By the time we had pumped the water out of the sap and restarted work the Hun was prepared for us and we had to give up the idea of an offensive show from that sap, and it was converted into what became in time to a very elaborate defensive system and the scene of continuous underground fighting.

The Long Gallery to Destroy Two Strong Points.

It was then decided to sink a large new shaft at a greater depth back in the support line. There was several reasons for sinking it so far to the rear, the principal one's was that the spoil could be disposed of more easily, and there was less chance of being observed, also we were not bothered by the infantry to such a great extent as in the front line and fewer people would see the work being carried on. This last was most important, as the work had to be carried on with the greatest secrecy, and the fewer that had any knowledge of the work the greater the chance of success.



This shaft was sunk to a depth of 101 feet in a little less than fifteen days.

The dimensions was six feet long by four feet wide, timbered skin tight. 9in. by 3in. timber was used.

At a depth of 35 feet a large elaborate dug-out system was driven.

This system had accommodation and bunking for one hundred men. Was electrically lighted by a small gas driven engine and dynamo. Was well ventilated and drained. Five sets of stairways were driven to the surface which allowed a sufficient number of exits for the men in case of an attack.

The main offensive gallery was driven towards the Hun front line a distance of 800 feet, at 300 feet a stairway and gallery was broken away to the left to connect with the large defensive system on a sixty foot level.

50 Tons Ammonal in the Charge.

After many weary months of hard, delicate, monotonous work, under the worst of conditions, the sap was pushed behind the German front line, swung to the left and one of the largest charges ever laid in underground warfare (a matter of 50 tons of ammonal) was placed between the two Hun strong points. These strong points are famous in Canadian War Records. They are better known as the St. Eloi Craters Nos. 2 and 3.

19 Mines in Messines Ridge Blow.

This mine was exploded at the beginning of the Battle of Messines Ridge. In this show 19 mines with charges ranging from thirty to fifty tons, at depths of 60 to 130 feet, were exploded simultaneously, the greatest show of its kind in history. The mines were laid out at intervals under strong points on a twelve mile front—from Hill 60 to Plug Street.

Object of the Tunnelling.

The object was not so much to kill Boche as to reduce these trench forts, demoralize the enemy and save British lives; and in every case the mines more than served their purpose.

Ordinarily a whole Company would be sacrificed in taking any one of these points and much valuable time lost, whereas in this show the attacking troops advanced over and beyond the Hun first, second and third line of defences with practically no opposition and no casualties, in fact, on part of the front they advanced to a depth of 3 miles without any greater loss of men than would have been experienced in the ordinary routine of trench warfare on a day that the Official Reports would show "Everything quiet on the Western Front."

From a spectacular point of view it was thrilling, wonderful and inspiring, it was not a sight that a man could see without being impressed, without feeling that even though it was glorious it was awful—awful to think that there were hundreds of men in that inferno you'd helped let loose. There never was nor never will be anything like it. As one of the boys from Caledonia remarked to his butty, "There's gotta be a mighty big change in the fire works at the Halifax Exhibition before they'll get a half dollar out of me again."

The Effect on the Enemy.

What the Hun's impression was I can only guess, as a matter of fact I don't believe there was any lasting impression because the majority of those that survived were dazed, their day of usefulness as fighters was a thing of the past. Some gathered sufficient energy to run, but the greater number seemed to have lost all interest in living and what was taking place, and what proved to be the greatest advance in one day, up to that date, on the most strongly held and fortified front, with a minimum of casualties, was accomplished due to the way being cleared by the mines and perfect artillery co-operation.

Miners Were Needed at the Front.

As sorely as miners were needed on the home fronts, that is, men as producers, the need in France in the early stages of the war was much greater. It was a work that called for miners and the best type of miners; men who would stand any hardship, go through any danger for the cause; men of skill and initiative.

Nova Scotia Miners Did Well.

It would be superfluous for me to say that those Nova Scotian miners who answered the call came up to that standard. Their record speaks for itself. No task was too great for them. All difficulties encountered were overcome. They handled the defense of a trench or went into the attack with the same spirit and high standard of efficiency as they handled the work underground.

A Miner's Show.

A story of one of their shows might well be told. Following the Messines show on the night of July 31st, an attack on a ten mile front was started to the north of Messines. This was really the beginning of what was afterwards called the Paschendale Push. A party of tunnellers was sent with the attacking troops, which were English, for the purpose of examining cross-roads, dugouts, and material dumps, for booby traps or land mines. Very often the Hun on evacuating a position would leave a concealed charge there. This charge would be exploded by a trip wire, an acid time fuse, or by any one of his hundred and one different contrivances. Before a dugout could be entered or used by the infantry it had first to be reported safe by the tunnellers.

The first wave of the attacking troops had pushed forward, leaving a regular village of concrete dugouts to be cleaned up by our boys, and when they went to enter they found the Hun still active, shooting the troops that had gone ahead, in the back, and firing on the second wave as they were coming up. The tunnelling officer, Mr. Murray from Springhill, got one of the English infantry officers to go to one of the large dugouts with him and ordered the Huns to surrender. For answer, the English officer was bayoneted in the throat. The party immediately withdrew to a shell-hole and started rifle fire, when Dan Lynk, of Glace Bay, thought of a scheme, which was carried out. His plan was for the party to split, one-half to keep sniping, the other to creep up on the blind side of the dugout, get on top, and from that elevated and comparatively safe position toss bombs down through the doorway.

Dan Lynk as Santa Claus.

Lynk got up without mishap and the others passed bombs up to him. Just before he started he noticed the Huns had put a 4-inch square vertical ventilator up through the centre of the roof. "Here," he thought, "is where I play Santa Claus," and dropped his little prize packets through the "chimney." Immediately the first exploded, the Huns made a frantic rush for the door to "Kamarad," and were met by the rifle fire of the party left in the shellhole, so rushed back just as frantically and another bomb exploded. This game of Puss in the Corner kept up until our fellows figured that Fritz was weary of it, so walked up and made prisoners of those that lived.

Dinnie Cameron is Decorated.

Dinnie Cameron, of the Dominion, was sent in to examine the place. Inside he found a door leading into a long underground passage, which in turn lead into a large comfortable room, where, much to Dinnie's surprise, a dapper little German officer was enjoying his beauty sleep. Dinnie gently woke him by jerking him out of bed by the hair. The German sprang to his feet in a great fright and Kamaraded. Dinnie observed that the Hun wore the iron cross, and instructed the Bosche to transfer the decoration to his tunic. Dinnie now has the distinction of being about the only Canadian decorated with the iron cross. True, it was not placed there by the Kaiser, but by his representative in the field—a commissioned officer.

The Miner's Working Day at the Front.

In civil life miners and standard houses go together. When a new mine is started one of the first things considered is the laying out of the town site and the immediate erection of comfortable dwellings. We all know that men cannot work underground all day with the best results and sleep in the bush, in a hut or a shack. He needs comfortable quarters. Likewise the army miner. He needs and deserves the best that can be given. He works harder and longer hours than his civilian brother, and under the very worst of conditions. I'll describe a few of those conditions.

The day was divided into four shifts of six hour periods. The men of No. 1 shift would breakfast at 5 a.m., go on duty at 5 and work until 12 noon, being relieved by No. 2 shift which worked until 6 p.m. On being relieved No. 1 gets dinner, a rum tot, and immediately goes to bed and sleeps till 5 p.m., when supper is given out. They go on duty again at 6 p.m., work till 12 midnight, and are again relieved by No. 2 shift. They have another meal and sleep until 5 a.m.—another day started. Thus they worked twelve hours a day, with about nine hours sleep, with no recreation or time for amusement of any sort unless at the expense of sleeping time. All this is in the front line trenches, and those men are below ground where if a raid was put over by the Bosche they would be entombed or trapped. Add to this the constant "strafe" of the so-called "quiet" day, and you have a picture of the tunneller's life during his "trip up"—he worked six days in the line and four days out, back at the company headquarters.

Underground, fortunately, we had no inspector of mines. If we had, the mines would surely have been idle. As I stated before, the galleries were only two feet three inches wide and four feet three high, close timbered; a small track was laid, over this ran a rubber-tired truck used to take the clay out from the face.

The galleries were of different lengths, some ran to 1,200 feet. The ventilation was of the worst imaginable. The air was forced down a three-inch rubber hose by a small hand worked pump to the face. At a few points only was there sufficient oxygen in the air to light a match or keep a candle burning. The saps were generally damp and smelly. Work had to be carried on at high speed, but silently. The men moved

about with their feet thickly padded with sand bags to muffle the sound of the tread; they sometimes went so far as to go barefooted. The man at the face, the post of honor, worked bare-buff, his clothing consisting of a pair of boots and a pair of pants.

Standard Dugouts Were a Success.

In the very early stages of the game both men and officers realized that comparatively safe and comfortable quarters were necessary; that a dry spot on the parapet, or a ramshackle dugout was not good enough for these men, so decided to "build" good, dry, safe dugouts. These were not successful, for numerous reasons. Then one of the officers thought it would be a good plan to "dig" our future homes—to make standard dugouts in conjunction with our mining scheme; to make the dugouts part of the scheme. This was tried and found to be highly successful. As time went on, our standard dugout, a wooden affair, seven feet high, seven wide, and generally thirty feet long, with an eight inch borehole to the surface for ventilation, was improved upon, and towards the last stages of the game the dugouts were all steel and finished, were seven feet high and nine feet wide, and ran sometimes to a hundred feet in length. The top and mud sills and side pieces were 5″ x 3″ I beams placed at 18 inch centres, with a sheet of corrugated iron above and between the I beams to keep the soil from falling through. The dugouts were finished with soft wood sheathing, pointed white, and bunks installed. There would never be less than five exits to a system, and in some of the large ones there were as many as twenty.

Generally a small gasoline motor and dynamo would be installed for lighting purposes. This was a necessity as well as a luxury, as lights were needed through the saps and candles would not burn, and the life of a portable electric mine lamp was too short.

Miners' Dugouts Appreciated by Infantry.

We were very comfortable and safe in our underground homes until one day an Imperial staff officer thought he'd like to take a look at a sap and see the dirty miners at work. At the beginning he was rather nervous, and kept us amused with his "I say, is there any chance of the roof dropping in"; "Is the water deep down there"; "I suppose these clothes will never be fit to wear again"; "My word, we must be deep"; "is that an electric light"; "I say this is most extraordinary"; and so on. He was most surprised to find clean, airy, dry dugouts below. "Didn't think such a thing possible in such soil." The outcome of that visit was an order to start building deep dugouts for the infantry, and some of our places were pinched for battalion headquarters, Y.M.C.A.'s, and such like. We weren't at all pleased at the way things turned out, and came to the conclusion that the best way to keep them out of our places was to build some for them. This was carried out, and in very short time dugout work was a very important part of the programme of every tunnelling company, and some very large systems were built. Some of these large ones had accommodation for a brigade of men.

These places were invaluable as concentration points before a push. Large numbers of men could be brought up at night and put in these dugouts and wait there for the show to start. They would be safe from shell fire and, what was more important, they were free from observation.

Underground Hospitals.

Large hospitals were built underground, almost in the front line. A man could get attention almost immediately he was hit. In this work, as in the other branches, the Canadian miner "showed the way." Their style of dugout was adopted by the army and made standard; their methods of handling the soil and construction were taught in the army mining schools, and when an important rush job was to be done the Canadian was sent to do it, and never was the trust misplaced.

The Canadian miner's record in this war is unexcelled, and is one of which he, and all Canada, may be very proud.

MAY OPERATE GREENWOOD SMELTER.

It is possible that the Greenwood Smelter recently closed down by the Canada Copper Corporation, which has moved to Copper Mountain, will be re-opened as the company has offered the plant and contiguous properties to the citizens of Greenwood for the sum of $125,000. As the continued existence of the town depends on the maintenance of an active mining industry, and as the company's proposition is considered very reasonable, it is very probable that it will be accepted and arrangements made for the revival of the new dormant mines and plant. At Boundary Falls is situated the New Dominion Smelter which has been idle for some years. This also has been proferred to Greenwood's business men, together with its mines, on favorable terms. Two or three alternative propositions have been advanced in connection with the latter and it is thought likely that one will be accepted. Hugh R. Van Wagenen, manager of the Canada Copper Company, states that while the basis fixed for the transfer of these holdings is low it has its advantage for the company if it can be financed by the Greenwood people. It would cost probably $400,000 to $500,000 to instal such a plant to-day even if delivery could be obtained, but it is costing the company for watchmen, taxes, insurance and other expenses around $500 or $600 a month to retain the property. By wrecking the plant probably $125,000 could be realized, but the company would prefer to see Greenwood live. The Greenwood committee assert that the Greenwood business is worth half a million dollars as a going concern and they propose, with the aid of outside capital, to keep the furnaces going. The mines included in the Greenwood deal are the Mother Lode Group, B. C. Mine, Oro Denora, Mountain Rose, Lone Star, and several others. Some of the equipment has been removed from the Mother Lode, but there is still one compressor, the hoist and the crusher. The equipment is sufficient to handle a couple of hundred tons a day, probably all the profitable ore that could be extracted from the mine in its present state of development. The smelter, however, is intact and ready to be blown in at any time. Mr. Oscar Lachmund, metallurgical engineer, who has been retained by the Greenwood Committee in an advisory capacity, is satisfied that there are ore supplies within shipping distance of the smelter to keep it running for years and it is believed that the cost of treatment with Mother Lode, Brooklyn or other fluxing ores will always keep the cost of copper production at a low point.

The Salt Industry and the Possibilities for the Future Development in Canada

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(By permission of the Director, Mines Branch.)
Paper presented at the Meetings of The Mining Society of Nova Scotia, New Glasgow, N. S., April 23-24, 1919.

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       2. Artificial Brines from Rock Salt.
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Until recently, the only salt deposits in Canada being exploited, were those located in Ontario, hence this province has been at a great advantage economically. With the discovery of rock salt at Malagash, N. S., and the prospect in the near future of operating deposits in the vicinity of McMurray, Alberta, considerable of the expected increase in the domestic demand will in a few years be available from these newly operated deposits.

The rapid development of the country during the Great War has led to the establishment of new manufacturing industries utilizing the natural resources of the country. The salt industry has, naturally, been influenced by this growth and plants have already been established in certain parts of the Dominion to utilize the large deposits of sodium chloride, as a base from which to produce other commercial chemicals. Past enterprise in this direction has only touched the fringe of the available resources. The chances of profitable exploitation and investment along this line of industry are worthy of serious consideration.

In order to bring to your notice the salient points of this subject I wish to describe briefly to you the merest outlines of the technology of the salt industry; to cover the uses of salt as shown in the table of contents attached; then to summarize the present known salt and brine deposits of Canada commencing from the Pacific and concluding with the deposit in which you will be most interested at these meetings, namely, the Malagash deposit of rock salt in Cumberland Co., Nova Scotia. I will conclude with a few remarks on the probable markets, both domestic and foreign, which have special bearing on the Malagash deposit.

1. The Technology of the Salt Industry.

The technology of the salt industry has, like many other industries, made great advances in the last twenty years. The improvements, however, have been along mechanical lines rather than chemical processes and all improvements tend to increase the production with the minimum amount of fuel.

The following flow sheet gives, at a glance, the methods employed in the recovery of commercial salt from nature.

Commercial salt is obtained from two sources in nature: a. rock salt, b. natural and artificial brines.

Rock Salt.

Rock salt is found in many countries in beds of such extent as to permit of it being mined or quarried; or else recovered by dissolving the beds with water and pumping the resultant brine to the surface, to be evaporated.

1. The Mining and Milling of Rock Salt.

Where the salt beds are sufficiently near the surface to enable the salt to be recovered directly, the common practice is to either quarry it or mine it by the pillar and chamber method. In the former case it is taken from an open quarry, possibly with very little stripping. Mining is generally carried on from a shaft sunk to tap the deposits. Galleries are run, and chambers mined out on each side of the gallery, leaving pillars at regular intervals.

The salt from both quarry and mine is generally crushed between cast iron rolls, after which it is screened. The coarse lumps are sold as lump salt while the material passing through the screens is fed into buhr mills. The ground salt from these buhr mills is passed through pneumatic separators, which take out the dust, and separate the market salt, or else it is screened into the different grades. When the salt is too impure to handle in this manner, it is dissolved in large tanks, and the saturated brine is evaporated by one of the several methods hereinafter described.

2. Artificial Brines From Rock Salt.

Where the beds of rock salt are at too great a depth to be worked economically by mining methods the common practice is to put a drill hole down to the beds and dissolve the salt by means of water, afterwards pumping the saturated brine to the surface and evaporating it.

The drilling of the wells is accomplished by the ordinary churn drill, common to oil drilling practice: The diameter of the holes at the collar being between 8″ and 10″. It is customary to carry the hole several feet through the salt bed, and to blast or torpedo the bottom in order to form a collecting chamber for the brine, when formed. The hole is then cased, to ensure that the brine will not escape through some of the overlying porous strata.

There are several methods employed in the pumping of the brine.

In the northern part of the Ontario salt field, where underground waters form the solvent for the salt, the most common practice is to pump the brine through the casing of the hole, by means of a plunger pump —after the Cornish pump pattern, with walking beam. In the southern part of this field, where water has to be forced down the hole, the common method adopted is to case the hole down to the top of the salt strata, and then to put down an inner piping, almost to the bottom of the hole. The case pipe has a diameter of from 6″ to 8″, and the inner piper from 3″ to 4″. The joint at the top between case pipe and the hole is made tight by a heavy rubber washer. Fresh pure water is then forced down the space between the outer casing and the inner pipe under sufficient pressure to cause the brine to flow up the inner tube. The brine pipe reaching to the bottom of the cavity ensures a saturated solution ascending to the surface.

A third method, sometimes adopted is to pump the brine by means of compressed air. In this method the double tubing is also required, air being forced down the inner tube, and allowed to rise through the outer tube, carrying with it the brine.

The brine coming from the wells is piped to settling tanks, where it is allowed to stand for a certain length of time, in order to allow any sediment or mechanically suspended matter to settle. In these tanks the brine is sometimes treated with lime, to precipitate any gypsum present; and in some plants is partially heated by means of exhaust steam, so that time will be gained when the brine is fed into the evaporators.

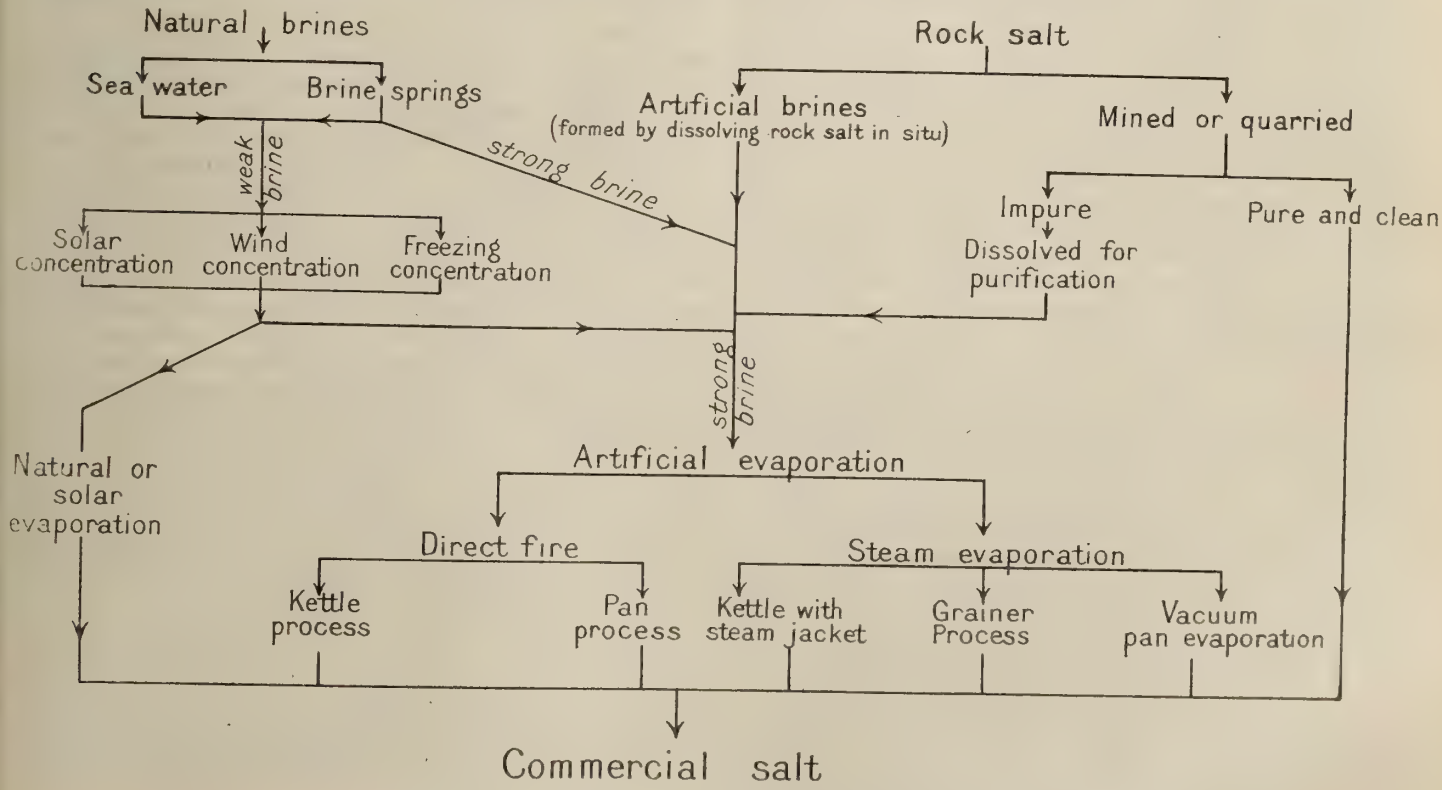
Salt From Brines.

In the recovery of salt from brines there are several methods being employed. These can more readily be followed by studying figure I. The three main processes for salt manufacture from either natural or artificial brines, are Solar Evaporation, direct fire evaporation and steam evaporation.

1. Solar Evaporation.

The recovery of salt from sea water and weak brines, has, in nearly all cases, been made by the solar method: employing the agency of the heat of the sun and the evaporating power of the wind. This method has not been employed with any great success in Canada, and it is doubtful if it will ever become a factor in the methods employed for preparing salt for the Canadian market. Briefly the method of preparing salt by solar evaporation may be described as follows:

Sea water or brine is allowed to run or is pumped into salt ponds or artificial vats and there allowed to stand, till all the impurities are settled out after which the purified brine is run into pickling ponds or vats where it is exposed to the sun and air. In these the brine is allowed to remain till, due to the evaporation of the excess water the brine has become saturated. It is then conveyed to the crystallizing ponds or salt rooms where the evaporation continues and the salt crystallizes out completely. The salt is then recovered and prepared for the market.



2. Direct Fire Evaporation.

Kettle Process. One of the earliest methods employed in the salt industry consisted in evaporating the brine in large hemispherical kettles, over an open wood fire. An improvement was shortly made in this method by setting the kettle in an arch of masonry. Later, two kettles were employed, then four, using the same fire, and finally, the kettles were placed in long rows, as high as 30 or 40 in each row; with one common fire box, and a common stack for several rows. The salt formed was removed by hand, and placed in baskets to drain. The method was, at best, very wasteful of fuel, since in order to heat the kettles furthest away from the fire box, heavy fires had to be made, and this caused an excessive heat under the nearest kettles. Naturally, on account of this difference in heat under the different kettles, a uniform grade of salt could not be obtained. Due, therefore, to these, and several other drawbacks, the kettle method of evaporation was gradually replaced by the English open pan method.

Pan. Process. As first adopted in Canada — upon rejection of the kettle method, the pan employed consisted of a long shallow pan placed upon two walls, with a fire-place at one end and a chimney at the other. These pans were made of ¼″ boiler plate, and were from 40 to 50 feet long, 12 to 20 feet wide, and 10 to 12 inches deep. One fire grate was used, and the products of combustion passed under the pan, and directly up the chimney. The best practice of the present at plants where the open-pan method is employed is, to have two or four pans in one "block," as these salt plants are called. If, for example four pans are employed, they are arranged in pairs, side by side; the pairs being placed end to end, so that one common chimney or stack is utilized for all four pans. Where the furnace gases pass under the length of the pan, and are then allowed to escape, the pan is generally divided into two compartments, two grades of salt being made in each pan; fine salt in the compartment nearer the fire grate, and coarse salt in the compartment farther from the fire, where evaporation is much slower. An arrangement by which an even grade of salt is made throughout the pan is, to divide the space underneath the pan into three chambers, and to allow the furnace gases to pass through the two outside ones, and return to the stack by the middle flue. The stack in this case is located beside the fire grate. This system has, in the base of a "block" of four pans, the advantage that all the fire boxes are situated on either side of one passage way, and can be attended to much more easily than if two were at either end.

The pans are made of ¼″ boiler rivetted together. The length varies from 90 to 120 feet, and the width from 18 to 24 feet, with a depth of 12 to 14 inches. The salt is removed as fast as it is formed by means of long scrapers. Between the two pans a walk, 6 to 8 feet wide, is placed, from which the man operates the rake. The sides of the pan are generally sloping, and bolted to the drainage boards (6 feet wide). The salt can then be raked directly from the pans on to the boards, and left there till thoroughly drained, before being removed in two wheeled carts to the drying bins. It is necessary that the salt be removed at prequent intervals, so that it will not cake on the bottom of the pan, and thus retard the conduction of the heat through the pan to the brine, or injure the quality of the product. If the brine is not agitated frequently by the removal of the salt by these rakes, there is a tendency for a film of crystallized salt to form on the surface of the brine as a scum, and thus prevent the escape of the steam of evaporation. The open pan method is employed in a number of the Canadian plants.

3. Steam Evaporation.

The fact that the preparation of salt by the open pan system was extravagant in fuel, and that the product obtained varied considerably, led to the adoption of other methods which utilized either exhaust or live steam.

Kettle With Steam Jacket.

The earliest use of steam in the salt industry was in steam jackets surrounding the kettles or pans of the kettle and open pan processes. A second bottom was placed under the kettle or pan, through which steam, either live or exhaust, was allowed to circulate. This produced a constant temperature in the evaporator, and thus an even product was obtained. The grainer system and the vacuum pan, however, produced the same results, and are much more economical; so that in nearly all the best plants, these processes are employed.

Grainer Process.

Grainers consist, in general, of shallow vats of various shapes, near the bottom of which a series of steam pipes are placed, through which steam is allowed to circulate, and heat the brine. These vats are generally rectangular in shape, with a depth of from 18 to 24 inches, a width of from 8 to 16 feet, and a length of from 60 to 120 feet. They may be built either of wood, lined with tile for protection, cement, or steel.[1]

The pipes are arranged after the manner of ordinary heating coils, so that the steam entering at one end passes through the whole series of coils before leaving the grainer. The pipes are generally 2″ diameter.

In best practice the salt is removed from the grainers by some continuous, operating form of mechanical rake. The two types most commonly used are the endless chain raker, and the reciprocating raker. In the former style of rake the lugs on the chain drag along the bottom of the grainer, carrying the salt with it, and deposit it on the inclined draining board at the end. This rake has the disadvantage of having the chain exposed to the corrosive action of the air while returning to the front of the grainer and the rust so formed is liable to discolor the salt. In the reciprocating rake, a rigid frame is operated back and forth on angle ledges on the sides of the grainer, the lugs on which frame are so fastened that on the back stroke they trail over the top of the salt and only push the salt along the bottom and up the incline on the forward stroke. The reciprocating motion is obtained by means of a hydraulic cylinder placed at the end of the grainer. The salt is thus shoved gradually up the draining board, from the top of which it falls into a trough, through which a conveyer runs, and carries it to the drying bins.

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[1]One variation in the grainer type that is quite common is the V-shaped grainer. In this type a scraper conveeyr runs along the bottom of the vat and scrapes the salt as formed to the end of the evaporator, where it is removed by an elevator. The pipes are placed above this conveyer.

These grainers may use either live or exhaust steam. The temperature can be regulated at will, so that the grainer can be made to produce whatever grade of salt is required.

Vacuum Pan Evaporation.

The application of the vacuum pan process to the manufacture of salt is a comparatively new departure. Although vacuum pans have been employed for many years in the sugar and other similar industries, it was not until the year 1887 that the first vacuum pan for the manufacture of salt was placed in operation. This pan was erected by Mr. Joseph Duncan at Silver Springs, N. Y. From that time their use has extended with gradual improvements, to all the more modern plants on the American continent.

The principal upon which the vacuum pan process is based is, that, when the pressure on the surface of the brine is decreased, the boiling point of the brine is correspondingly lowered. The brine can then be evaporated with a great saving in the amount of heat required. The heating medium employed in evaporation of the vacuum type, is steam, either live or exhaust. No vacuum evaporators have been, so far, designed to successively operate by direct heat.

Vacuum evaporators may be operated in series as double effect, triple effect, quadruple effect, etc. When the pans are employed in this manner, the steam formed by the evaporation of the brine in the first pan is conducted to the heating chamber in the second pan, in which a greater vacuum is carried. Likewise, the steam generated from the brine in the second pan is led to the steam chamber in the third pan, where a still greater vacuum is maintained. Similarly, each pan is heated by the steam produced in the preceding pan, for as many pans as are operated in series. The steam from the last pan is carried to a condenser. The vacuum in each pan is created by the condensation of the steam in each succeeding steam chamber, the vacuum in the last pan being produced by a vacuum pump.

The construction of the several types of evaporators employed in the salt industry varies only in a few minor details. They consist essentially of four parts, namely:

(1) The evaporating and condensing chambers,
(2) The heating element,
(3) The coned bottom,
(4) Salt filter, or barometric leg.

Evaporating and Condensing Chambers.

The main body of the evaporator may be built of steel, cast iron, or copper, generally circular in cross section, and either cone, or dome-shaped at the top. The height of this chamber varies with the diameter, and is made sufficiently high to prevent the escape of any of the brine by entrainment, or foaming. In order to prevent a loss of heat by radiation, the evaporation chamber is covered completely (as well as all other parts of the evaporator) with a heavy coating of asbestos packing. The condensing chamber is of the usual type, furnished with a vacuum pump.[1]

The Heating Element.

Two methods of applying heat to evaporate the brine are employed. In the first, a steam chamber is placed between the evaporating chamber and the coned bottom, in which a series of copper tubes, varying from two to four inches in diameter, are fastened vertically in the top and bottom plates of the chamber. These tubes are open at either end, and thus permit free circulation of the brine between the cone-shaped bottom, and the evaporating chamber. The steam is passed into this chamber, and circulates in and out around the tubes, thus heating the brine circulating within them. The condensed steam is drawn off by suitable means from the bottom of the steam chest. The second method employed in heating the brine is to have the steam pass through a series of coils, or tubes, around which the brine has free circulation. In this method of heating, special means have to be adopted to properly dispose of the condensed steam, and the coils of pipe have to be so arranged as not to impede the salt, as it is formed, from descending into the cone-shaped bottom.

One of the great difficulties encountered in the application of vacuum pans to salt manufacture is the scale which deposits upon the heating surface.[1] This has to be removed at frequent intervals, or else the evaporative capacity of the pan will be greatly reduced. In order to facilitate the removal of this scale, the heating element should be either removable from the pan, or else easily accessible.

The Cone-shaped Bottom.

The bottom of the pan is sharply coned, so that the salt crystals, as formed, may readily fall to the bottom, clear of the heating tubes, and can then be drawn off from time to time. The pipe for the entry of the brine is generally attached to this cone.

The Salt Filter, or Barometric Leg.

In order that the operation may be continuous, there must be some means of removing the crystals of salt as fast as they are formed. This is accomplished in two ways: (1) by a salt filter, (2) by a barometric leg. In using a salt filter, the salt is drawn off into a filter or chamber, connected with the cone bottom. The connecting valve is closed when the filter is filled, and the salt is removed without stopping the operation of the evaporator. Sometimes two pipes lead from the cone to two filters, so that, when one filter is being emptied, the valve to the second is opened and allowed to fill. This prevents any possibility of clogging of the salt crystals in the bottom of the cone. In the barometric leg the salt falls continuously down, and is removed from the bottom by a closed elevator. This method is very efficient, when working on a large scale.

The salt made in vacuum pan evaporators is mostly of a very fine grain, and, consequently, has not entirely succeeded in replacing the grainer, the latter being able to produce varying grades of salt, according to the amount of heat supplied.

Preparation of Salt from Evaporation, for the Market.

All salt, whether manufactured in the vacuum or open pan, is generally allowed to age or season for at least two weeks before being shipped either in bulk or barrels. This seasoning gives time for the salt to become thoroughly drained and free from excess brine. The stock house in which the stock is stored is generally on the floor underneath the level on which the graiuers are situated. The salt is then wheeled

[1]When working in double or multiple effect, the heating element or steam chest of the succeeding unit is the condensing chamber for the preceding evaporator.

[1]This scale is, in most cases, composed of calcium sulphate, which is present in the original brine, and in the best practice this is largely removed before the brine enters the evaporators.

in carts along trestles over the stock house, and dumped on the floor below.

The crude salt is shipped in bulk, being placed in cars or boat by any suitable means.

When packed in barrels the packing is carried on by hand on the floor of the stock house. Each barrel contains 280 pounds net. These barrels are generally manufactured on the premises.

In the case of table and dairy salt, a further treatment is carried on before the salt is placed on the market. The crude salt is passed through long, cylindrical, rotating driers, in which a current of hot air is blown through in the opposite direction to that in which the salt is moving, i.e., in a direction counter to the incline of the drier. After being thoroughly dried, it is passed through a series of screens of various sizes, and then automatically bagged and sold as Dairy, Table, and Cheese salt. Each company has a special trade name under which it markets its product.

By-Products From the Industry.

The brine used for the recovery of salt, in many cases, contains small quantities of other salts, etc., which in some cases are recovered. Bromine, potassium salts, glaubers salts, epsom salts, and calcium chloride are some of the by-products which are being saved commercially.

2. Uses of Salt.

Salt is one of the essential materials in many of our present day industries. Its use is being extended all the time. The possibilities for extending the salt industry in Canada are good and with the return of normal conditions throughout the country the salt production should show a substantial increase. The uses of salt are numerous, but they may briefly be described as follows:

a. Domestic.

For table and culinary consumption the salt is generally required to be very white and fine, and to be as free from impurities as possible. The salt made in the vacuum pans is ideal for these purposes. In the Dairy and Cheese making industries a slightly coarser grade is required. For refrigerating purposes a coarse salt is best suited and for salting cattle, both in the stable and in the field, a coarse grade or lump salt is employed, the latter form being preferred.

b. Fish and Meat Curing.

The salt for the fisheries is generally a granular salt the bulk of which is caught by a 20-mesh screen. The color and purity are factors in the marketing of salt to the fishermen as they are very particular that the color and taste of their fish is in no way impaired. A similar grade of salt can be used for the curing of meat.

c. Metallurgical Industries.

Salt finds an extensive use in the metallurgy of copper, lead, silver and gold in chloridizing roasting and leaching processes, as well as in the refining of copper-nickel matte by the Oxford process. As high as 10% of sodium chloride is aded to the charge in some of the roasting furnaces.

d. Associated Chemical Industries.

One of the most important uses of sodium chloride is in those chemical industries which prepare sodium salts for the market. In order that some idea may be obtained of the possibilities of developing these industries I will give a brief resume of several of the more important processes for the manufacture of these chemicals from salt.

Caustic Soda. (Sodium Hydrate.)

Until the last fifty years, the manufacture of caustic soda was not extensive. The most common process in preparing this material was the one in which advantage was taken of the reaction of sodium carbonate and slaked lime. This process at first entailed the production of soda ash. Of late years, however, caustic soda has been prepared by the direct decomposition of sodium chloride in an electrolytic cell; producing chlorine gas and metallic sodium, which latter at once unites with water present in the cell to form caustic soda. The weak solution of caustic soda thus produced is concentrated in vacuum pan evaporators. From these evaporators the solution passes to storage tanks after passing through separators — to eliminate the sodium chloride. The final concentration is then carried out in finishing pots of about 18 tons capacity and the pure caustic soda is run from the final pot into iron drums (700 lbs. capacity), and allowed to solidify. The product is then ready for the market. One firm is already making caustic soda in Canada by this process.

Sodium Carbonate. (Soda Ash.)

Although sodium carbonate is often found in extensive deposits in nature, it is generally very impure. Owing to the cost of dissolving, evaporating and purifying, it rarely pays to operate a deposit of this nature except at actual points of consumption as commercial sodium carbonate can be prepared artificially from sodium chloride at less cost.

In the artificial preparation of sodium carbonate there are three processes of importance which use sodium chloride as a raw material. These three processes are: (1) the Solvay, or ammonia-soda process, (2) the electrolytic process, (3) the Le Blanc process.

(1) The Solvay Process.

This process is based on the well known reaction of ammonium bicarbonate on sodium chloride, with the separation of part of the sodium as sodium bicarbonate. The raw materials required for this process are limestone, sodium chloride (either as brine as it comes from the wells or rock salt dissolved) ammonia (either in the form of an ammonium hydrate solution or ammonium sulphate) and fuel.

In brief, the essential operations in this process are, to manufacture carbon dioxide from limestone; to pass this gas into the ammoniacal brine which has previously been prepared by saturating the brine with ammonia gas; the separation of sodium bicarbonate which forms as a precipitate from the solution; and the calcining of this precipitate to form sodium carbonate or soda ash. The product of this method is remarkably pure and will average over 98.5% sodium carbonate, the principal impurity being sodium chloride.

(2) Electrolytic Process.

An electrolytic process for the manufacture of sodium carbonate crystals by the electrolysis of brine has been operated commercially on a small scale, in England. This process, known as the "Hargreave and Bird process" employs a diaphragm cell of unique arrangements. The diaphragm is impervious to the salt solution, but permits the sodium ion to pass to the cathode. As the sodium ions are set free, they are converted into soda crystals by the blowing in of steam and carbon dioxide. The sodium carbonate made by this process is very pure and will average when dehydrated 97.5 to 98% Na_2CO_3.

(3) The Le Blanc Process.

This process for making sodium carbonate from salt consists of first making sodium sulphate — to be later described — and then fusing this with a mixture of limestone and carbon. The raw materials required are sodium sulphate (salt cake), pure limestone and a good grade of coking coal. The reactions are involved but the process in brief, is as follows: The salt cake, limestone and coal in predetermined proportions, are fused in a furnace and the fused mixture, called black ash, which is produced is allowed to cool. The black ash is then lixiviated with water and the resultant lye is purified giving commercial sodium carbonate which will vary in composition from 75 to 98% Na_2CO_3. The finished product from this process should be white or nearly so.

Both the crystal form and the soda ash are met with in commerce. The crystal form known as soda crystals or washing soda has the formula $Na_2CO_3 . 10H_2O$. These crystals readily dehydrate and effloresce when exposed to the air.

Sodium Sulphate (Salt Cake.)

Like sodium carbonate, sodium sulphate occurs naturally, but owing to the artificially manufactured substances being so cheap, it seldom pays to use the natural deposits.

The commonest process for producing sodium sulphate is by the action of sulphuric acid on sodium chloride. The salt for this process is preferably rock salt, or the coarsest salt produced from evaporation.

The process may be carried out in two ways: (1) sulphuric acid, as such, may be added directly to the salt or (2) sulphur dioxide, oxygen and steam may be added to the sodium chloride.

By the first method the acid sodium sulphate is formed, and this reacts again with salt to form sodium sulphate.

In the second method, known as the Hargreave process, steam and oxygen are caused to combine with sulphur, dioxide to form sulphuric acid which simultaneously attacks the salt, forming sodium sulphate and hydrochloric acid, as represented by the following equation:

$$4NaCl + 2SO_2 + 2H_2O + O_2 = 2Na_2SO_4 + 4HCl.$$

Chloride of Lime (Bleaching Powder.)

When dry chlorine gas is passed over a thin layer of slaked lime, a compound is formed which has the power to readily give up its chlorine, when acted upon by an acid.

In brief, the process generally employed in the manufacture of bleaching powder is to utilize the chlorine gas produced by the electrolytic decomposition of sodium chloride and pass it through a series of lead-lined chambers in which slaked lime is spread on the floor to a depth of about two inches. Generally a number of these chambers are operated in series. The bleaching powder is discharged through openings in the chamber floor to the shipping room beneath. It is then packed in drums of 700 lbs. capacity.

The percentage of bleach in the chloride of lime thus produced will vary from 37 to 39 per cent. chlorine, i.e., the bleach contains from 37 to 39 per cent. chlorine that is available for bleaching purposes.

I have devoted considerable space to the sodium salts as these are of great importance, and it is only within the last ten years that any of them have been manufactured in Canada. The rapid growth and commercial progress made by the Dominion during the last few years has greatly increased the demand for those chemicals into the manufacture of which sodium chloride enters either directly or indirectly as one of the principal raw materials. The increasing demand for these chemicals — as evidenced by the figures of imports shown in the following table, has naturally evoked the question whether they cannot be manufactured in Canada. This question has been partially answered by the fact that one company is already successfully producing caustic soda and bleaching powder from sodium chloride in the form of brine, and another company has a plant completed for the production of soda ash by the Solvay process. There are several other chemicals in the manufacture of which sodium chloride is used; and there is no reason why use should not be made of the extensive salt deposits of Canada for their production. In view of the rapidly increasing market there should be no difficulty in the disposal of the products of such undertakings.

e. Incidental Uses of Salt.

Besides the uses already mentioned there are a number of other markets for salt, such as in the construction of wooden ships, the salt glazing of pottery and for the preventing of cracking of bricks in drying and firing, and in the manufacture of carborundum. A coarse grade of salt is also used as a land dressing for certain crops.

3. THE SALT DEPOSITS OF CANADA.*

Salt producing springs or beds of rock salt have been encountered in nearly every part of our Dominion. A number of the springs, of course, are only weakly saline, but may indicate the presence of beds of rock salt in the vicinity.

*For more detailed descriptions of the salt deposits of Canada see Salt Deposits of Canada and The Salt Industry. L. H. Cole, Mines Branch report No. 325, 1915.

Imports of Caustic Soda and Chloride of Lime.

	Caustic Soda		Chloride of Lime	
	Pounds.	Value.	Pounds.	Value.
1910	13,974,444	$267,338	10,386,519	$116,923
1911	13,812,053	259,982	11,725,167	118,501
1912	14,544,545	278,579	12,183,765	113,346
1913	15,983,298	291,008	12,761,153	115,614
1914	18,436,827	314,278	15,147,645	138,619
1915	7,737,149	184,468	12,015,999	112,142
1916	12,502,758	508,860	7,892,923	158,546

Note.—For purposes of comparison the pre-war years—1912-13-14 should be examined.

a. British Columbia.

Until the last few years, the known occurrences of salt in British Columbia were in the form of a number of saline or mineral springs, the waters of which are more or less saline.

In August, 1911, however, reports came in of the discovery of a strong saline spring 45 miles from Prince Rupert, situated on the banks of the Skeena river, at Kwinitsa, on the line of the Grand Trunk Pacific railway. That year, the location of the spring was staked and recorded by one of the cooks in the construction camps. Experiments were carried on in a crude way and it was found that the brine was strong enough to collect considerable quantities of a good quality of salt, by evaporation.

Early in 1913, a syndicate of western men started drilling operations in an endeavor to locate rock salt at this point, and in April of the same year, their efforts were rewarded — according to reports — by encountering salt in five different holes. During 1913, some 15 tons of salt were produced from this deposit. A company entitled the British Columbia Salt Works, Ltd., Prince Rupert, B.C., was organized and expected to have a plant operating by the fall of 1914, but due to the war the project was abandoned for the time being.

Of the known brine springs occuring elsewhere in the Province, the most strongly saline are those at Nanaimo, Admiralty or Salt Springs island, Chilcoton Valley, and Maiden Creek, and Bonaparte Valley, northwest of Ashcroft, B. C. The flow of these springs is not so copious, or the strength of the brine sufficient to warrant a belief in their economic importance at the present time.

b Alberta, Saskatchewan and North West Territories.

In the prairie provinces of Alberta and Saskatchewan as well as the North West Territories, numerous saline springs are known to occur. Up to the present time, however, these have not been economically important, owing to their inaccessibility to ready markets. Moreover, very little is known about them, and so far I know of only one definite attempt to prospect for rock salt in place. Since the springs occur over such a wide area, it is possible that stronger brines, in more favorably situated localities may yet be found, and there is always the possibility of finding beds of the mineral in place near the surface. The Mackenzie basin, in which all the springs at present known, occur, has been lacking, until recently, in railway transportation. With the advent of the railway into McMurray, it is altogether likely that this district will become a salt producer, and furnish this necessary article of consumption to a portion of the prairie provinces and British Columbia.

Probably the most important occurrence of salt in the district in question is that of the Northern Alberta Exploration Co. This company has, since 1907, been carrying on drilling operations for oil in the vicinity of McMurray, Alta. Two wells have been sunk, in both of which they claim to have encountered rock salt or salt bearing formation. The first hole has been drilled to a depth of 1475 feet, while the second reached a depth of 1406 feet. The collars of the holes are 155 feet apart and according to the logs of the wells (here given) show the same formations in each hole.

	No. 1	No. 2
Loose dirt	17 feet	24 feet
Limestone	117 "	124 "
Soapstone and Limestone.	520 "	590 "
Salt formation	620 "	690 "
Limestone	635 "	765 "
Salt Formation	740 "	855 "
Limestone	770 "	935 "
Sandstone	1475 "	1406 "

There is a possibility that this coming summer a plant for the preparation of salt from brine may be erected on this property.

Of the brine springs, the most accessible seem to be those occuring at La Saline, 26 miles north of McMurray and these have from time to time been noted by the several explorers of the district. The brine will run about 25° salinity, 100° being a saturated brine.

Other saline springs are found at numerous points further north in the Mackenzie basin, notably at Salt River, Slave River District; Tar Island, Peace River, Red Earth Creek, and Great Bear River, North West territory.

In the plain lying to the north of the Cypress hills, Saskatchewan, numerous small lakes occur which are more or less saline and there are also many alkali lakes throughout the prairie provinces which carry small quantities of sodium chloride associated with other salts.

c. Manitoba.

Beds of rock salt have not, as yet, been discovered in the Province of Manitoba, but numerous brine springs are known, and from these, in past years, salt has been recovered by evaporation. When first these springs became known, the area in which they occurred seemed to be limited to the district lying to the west of Lake Winnipegosis, and this still remains the only district in which natural flowing springs occur. Of late years, however, in drilling operations in the vicinity of the city of Winnipeg and the district to the west as far as the boundary line between Saskatchewan and Manitoba, brines have been encountered in numerous holes and wells. Further drilling will most likely demonstrate a considerably larger area under which brine waters may be found.

The saline springs in the northern part of the province have, in past years, been utilized for the manufacture of salt. For the convenience of reference only the localities where these waters have been found have been divided, tentatively, into three districts.

The Winnipegosis District.

In this district the saline waters all appear in the form of flowing springs. The area in which these springs occur, is approximately confined to the west shore of Lake Winnipegosis, and the district between Lake Winnipegosis and Porcupine and Duck mountains on the west. The southern boundary is Dauphin lake; and the northern boundary the northern shore of Dawson bay. In this area, as outlined, numerous saline springs are known to rise to the surface through the till which covers the district in question.

The topography of the district is that of low lying country, at an average elevation of only a few feet above the level of the water of Lake Winnipegosis. To the west, the prominent ridge of the Manitoba escarpment rises to a height of from 1,000 to 1,500 feet above the surrounding country. The whole area is, with the exception of small portions of the southern part, covered with a growth of small pine, spruce and poplar, which increase in size farther to the north.

The saline springs throughout this district are very numerous, and many small saline areas can be noticed where the brine oozes up through the overlying drift.

The areas in the Winnipegosis district visited by the writer were all very similar in appearance, and one general description for them all will suffice. In general, they consist of a barren area, varying from a few acres to over a hundred acres in extent, devoid of any vegetation, with the occasional exception of scattered patches of the red salt plant (Salicornia herbacea). Surrounding these areas there are generally a few acres of meadow land, with timber consisting of pine, spruce, and poplar, enclosing the whole area

Here and there in the barren flat, saline springs bubble through the till, forming in some cases small truncated, conical mounds of reddish sinter, in the centre of which lie clear pools of brine. In some of these springs bubbles of gas are constantly rising. The brine, flowing from the pools, spreads over the whole flats, and either evaporates — leaving a thin deposit of salts or, if the flow is strong enough, forms a small stream of brine.

Occasionally, the brine is found in lakes or pools some 20 or 30 feet in diameter, in which the surface is constantly constantly moving, owing to the bubbling up of the brine from below. These are surrounded by mud flats covered by a sod of coarse bunch grass. The ground in the vicinity of this type of spring is generally marshy.

The brines of all springs vary greatly in their salt content and will range from 10° to 26° salinity.

Westbourne District.

The region included, in this district, covers the area lying to the west of Portage la Prairie and the western boundary of Manitoba and south of the town of Dauphin. In this district, several saline areas occur, and a number of drill holes have encountered saline waters. The principal localities where saline waters have been noted are, in two wells near Gladstone, Man., in a saline spring seven miles west of Westbourne and in a well drilled for gas, about 200 yards from the C. P. Ry. station at Neepawa. In this latter hole two flows of strong brine were encountered at depths of 1225 feet and 1455 feet respectively. It is interesting to note that the brine from this last well, although high in calcium chloride and calcium sulphate, contained the highest sodium chloride (common salt) content of any examined from Manitoba. The total solid content was 190.896 grammes per litre or approximately 72° salinity.

Winnipeg District.

A syndicate of Winnipeg men have drilled 7 wells in the district within a radius of 20 miles of Winnipeg and in five of them they encountered water of a more or less degree of salinity. In all cases, however, the brines thus encountered were not of sufficient strength from which to commercially manufacture salt.

d. Ontario.

Ontario, at the present time, is the centre of the salt industry of Canada. The salt obtained in this province is recovered by the evaporation of brine which has leached out rock salt from beds which occur in the Saline formation in the southwestern part of the Province bordering on Lake Huron; the St. Clair river; lake St. Clair; and the Detroit river. It is im possible, with our present knowledge, to determine definite boundaries of the salt basin; but, as far as it now stands proved, the area underlain by salt in Ontario is approximately contained within lines joining the towns of Kinkardine, Teeswater, Brussels, Seaforth, London, St. Thomas, on the west; and Thamesville, Dresden, across lake St. Clair, through Elmstead to a point on the Detroit river between Amherstburg and Sandwich. The area enclosed within this boundary in Canada is about 3,000 square miles.

The salt beds are known to vary in thickness. In some wells they occur in thin beds interstratified with dolomite and shale; the total combined thickness of all these beds varying from 100 to 200 feet. In other localities, as in the case of the beds at Windsor, the salt beds are of great thickness, one bed alone having a thickness of 200 feet. The average depth at which the salt is found is in excess of over 1,000 feet, there being a gradual increase in depth of the beds as one goes farther south.

The production from a few wells has hitherto been sufficient to supply the domestic demand, and little exploration has been carried on by which the area underlain by salt can be definitely outlined. There has, however, been a great deal of exploratory work in connection with the development of petroleum and natural gas fields. Where these boreholes extend below the salt horizon, they give evidence of either the presence, or the absence of salt.

From the records available, it would appear that within the area mentioned, the salt beds are practically continuous; there are, however, some limited areas within these boundaries where — according to the records of drill holes that have penetrated below the Salina — there are no salt beds.

The southeast boundary of the salt area is at present unknown, as no drill records are obtainable from the district along the north shore of Lake Erie between St. Thomas and Chatham. Records from a hole at Orford, Kent county, show 171 feet of salt, at 1,510 feet below the collar of the hole; while another from Glencoe shows 104 feet of salt, at 1,290 feet below the surface. These records lead one to believe that possibly the beds are dipping to the southeast and may be found by deeper drilling in the vicinity of Lake Erie.

The southwestern boundary merely marks the dividing line between the area beneath which salt beds are encountered, and the area where brines of a more or less density were found, although no rock salt was obtained.

The salt beds are supposed to extend under the Detroit river; Lake St. Clair, St. Clair river, and the southern part of Lake Huron, since rock salt has been found in the Salina formation in the State of Michigan, on the opposite side of the International Boundary.

All the salt is obtained from the evaporation of waters which have been allowed to remain in contact with the salt beds until a saturated solution has been formed. The water employed is derived either from natural underground springs, or else is forced down through the cased drill holes penetrating the salt beds. The brine produced in this district is very pure and seldom requires the addition of any chemicals to precipitate impurities. An analysis of brine taken from one of the salt wells in this district showed the following composition:—

	Per cent.
$NaCl$	26.6415
$CaCl_2$	0.1895
$MgCl_2$	0.1884
$CaSO_4$	0.2757
H_2O	72.7049
Total	100.000*

*F. G. Wait, analyst.

The salt is prepared by one or other of the methods previously described in this paper.

Brine from this district is already being used at Sandwich, Ont., in the manufacture of caustic soda and chloride of lime and another plant has been recently completed for the manufacture of sodium carbonate (soda ash) at Amherstburg.

e. Maritime Provinces.

New Brunswick.

In this province no beds of salt have, so far, been discovered. Several localities, however, are known where brine springs have been observed. These springs apparently have their origin in the rocks of Lower Carboniferous age. Small quantities of salt were manufactured each year from the brine of these springs; but for the last ten years, operations have ceased. The best known localities are at Sussex, and Salt spring brook, both in Kings county; and on the Tobique river, Victoria country.

Nova Scotia.

In the province of Nova Scotia no deposits of salt with the exception of the Malagash deposit, have, so far, been discovered; but numerous saline springs of a greater or less degree of salinity are known to occur. These springs, where noted, seem to have their origin from the beds of the Lower Carboniferous formation, and are closely associated with the gypsum deposits which occur so extensively in this formation, throughout the province. Numerous drill-holes have been put down throughout the province, passing completely through the Lower Carboniferous formation, but in none of them has rock salt been found.

Attempts have been made from time to time to manufacture salt on a commercial scale from these springs; but where have all been abandoned. At the present time there is no production of salt in the province. The weakness of the brine, and the consequent high cost of production, have, so far, made it impossible to compete with the Ontario salt, or that imported from the United States, or Great Britain.

A few of the places at which brines occur will be mentioned.

Whycocomagh:—Brine springs have been noted half way between Baddeck and Whycocomagh, on the road running along the northwest shore of St. Patrick's channel. The brine has a strength of about 19° salinity.

Antigonish:—In the vicinity of the village of Antigonish and in the adacjent district numerous saline springs and ponds are found. A brine flow was encountered in this district at a depth of 159 feet from the surface. A number of years ago an attempt was made to utilize this brine and a considerable quantity of salt was made, but the brine becoming weak, the work was abandoned.

Spring Hill, Cumberland Co.:—Attemps have been made to manufacture salt at Spring Hill from a brine spring which was reported to be about 30° salinity, but operations were soon abandoned.

Cheverie, Hants Co.:—In two bore holes drilled at Cheverie, strong brines were encountered at depths of 1400 and 1870 feet, respectively. The brine was reported as having a strength of 76° salinity. Other springs have been noted at Walton, Hants Co. and Salt Springs, Pictou Co.

With the discovery of a deposit of rock salt at Malagash, Cumberland Co., Nova Scotia, the prospect for extending the salt industry to this province looks very encouraging. This is the first known discovery of rock salt in the Maritime Provinces and the first in Canada to be discovered at a depth sufficiently shallow to enable it to be won economically by actual mining.

Discovery and History of the Malagash Deposit.

Some time in 1912 Mr. Peter Murray drilled a well for water on his farm on the Malagash road, about 7 miles northeast of Malagash Station, a station on the C. G. Ry. branch line operating between Orford Jnc. and Pictou. He encountered salt water and sent a sample of the same to Dr. F. Shutt of the Dominion Experimental Farm at Ottawa. Dr. Shutt reported on this sample as follows:

	Malagash Brine, N. S.	—Western Ontario Brine—			
Sodium (Na)	99.50	96.270	101.728	96.368	100.397
Potassium (K)	0.55	n.d.	n.d.	n.d.	n.d.
Iron (Fe)	0.07	n.d.	n.d.	n.d.	n.d.
Calcium (Ca)	1.37	1.552	1.630	2.496	1.531
Magnesium (Mg)	0.22	.244	.257	.127	.118
Sulphuric Acid (SO_4)	3.11	2.631	2.634	1.698	2.803
Chloride (Cl)	154.70	150.122	158.742	152.294	156.884
	259.52	250.319	265.001	252.983	262.333
Hypothetical Combination: Parts per thousand.					
Sodium Chloride ($NaCl$)	252.90	244.860	258.770	245.111	256.891
Potassium Chloride (KCl)	1.04	n.d.	n.d.	n.d.	n.d.
Magnesium Chloride ($MgCl_2$)	0.66	.966	1.017	.503	.467
Calcium Chloride ($CaCl_2$)	0.22	1.265	1.484	4.964	1.007
Calcium Sulphate ($CaSO_4$)	4.42	3.728	3.730	2.405	3.971
Ferric Oxide (Fe_2O_3)	0.10	n.d.	n.d.	n.d.	n.d.
	259.54	250.818	265.001	252.983	262.336
Sp. Gravity at 15.5°C.	1.200	1.197	1.2045	1.178	1.198

"Our analysis of this water shows it to contain 28.83% total solids, of which 28.32% is common salt. It is in fact a very strong brine.

"There are present very small quantities of sulphate of lime and possibly of allied compounds, but essentially this is a saturated, or practically saturated, solution of common salt."

No action was taken with regard to this discovery until the early month of 1917 when another sample was forwarded to Dr. Shutt who reported 26.65% common salt content. At this time Dr. Shutt referred the parties interested to Dr. Haanel, Director of the Mines Branch, Department of Mines. The Mines Branch immediately obtained another sample and had it analyzed. It was found to be a saturated brine, its analysis being given in the accompanying table, together with four analyses of brine from the Western Ontario district, for comparison.

As a result of this analysis it was suggested that further exploration was desirable in order to ascertain if the parent salt bed could be located. It was also decided that the writer should visit and examine the locality at the earliest possible moment. When the locality, therefore, was visited in June, 1917, brine had been encountered in several other holes. A personal examination of the local conditions convinced the writer that there was a good possibility of discovering rock salt in place, and he strongly advised the owners to continue their prospecting along lines already advised. Subsequent development has demonstrated that these deductions were sound.

In the summer of 1917, A. R. Chambers and George McKay of New Glasgow, N. S., took an interest in the operations and drilled a series of holes, after which they sank a prospect shaft—June, 1918. In this shaft rock salt was encountered at a depth of 85 feet from the surface and when the locality was again visited by the writer on October 10, 1918, it had penetrated to a depth of 17½ feet in the salt formation. Since then I have been informed that the shaft has penetrated about 25 or 30 feet in the salt formation and that they are now drifting on the deposit.

The overlying beds penetrated by the shaft appear to be in a nearly horizontal position and consist of clays, soft shales, gypsiferous muds, etc.

The underlying saline beds appear to dip to the west of south at an angle of about 25° and have a strike of S.70°E.

The saline beds as encountered in the shaft, show, in the upper 12 feet, considerable impurities in the form of mud, but there appear to be banded layers of whiter rock salt as one goes deeper. The indications from a drill hole located on the site of the shaft, are that the salt beds have a thickness, at this point, of at least 50 feet.

The saline beds are found associated with beds of gypsum, mapped by Fletcher as of lower Carboniferous age. These gypsum beds are seen exposed on the shore to the north of the shaft. To the south of the shaft there is a small unmapped outcrop of what appears to be New Glasgow conglomerate. The salt beds are on the south slope of an anticline, and little is so far known as to their lateral extent. To the west, about one mile from the shaft, there is a pronounced fault shown in the shore section, and this may cut off the western extension of the beds. To the east, about the same distance, the occurrence of a marsh, caused by the sea eroding the northerly lying and protecting sandstone barrier, may determine the eastern extension of the deposit. The evidence at hand, however, indicates the presence of a salt formation of considerable extent. On the basis of data obtained from the shaft, from surface indications, and from the drill holes, it is possible that the saline formation, measured at right angles to the dip, may have a thickness of 175 feet.

A general sample of the whiter rock salt was taken for analysis with the following results:

	Dried at 110° C.
Sodium (Na)	38.45
Potassium (K)	0.20
Iron and aluminium (Fe and Al)	none
Calcium (Ca)	0.25
Magnesium (Mg)	trace
Sulphuric acid (SO_4)	.61
Chlorine (Cl)	59.35
Insoluble in water	1.05
Total	99.91

	Conventional Combination.
Sodium chloride (NaCl)	97.60
Potassium chloride (KCl)	0.40
Magnesium chloride ($MgCl_2$)	trace
Calcium chloride ($CaCl_2$)	none
Calcium sulphate ($CaSO_4$)	0.86
Ferric oxide (Fe_2O_3)	none
Insoluble in water	1.05
Total	99.91

Analyst: T. W. Hardy, Mines Branches.

Although the quantities of potash salts present in the two samples examined from this locality are small, it does not of necessity mean that they are absent in commercial quantities in this area. The drilling and prospecting so far carried out have only in the most superficial way indicated the present of a large bed at one horizon, and the probability of encountering potash salts, interbedded with the sodium chloride at other horizons than the one penetrated by the prospect shaft and drill holes, is quite within the bounds of possibility.

There is an interesting point which may be worthy of noting in passing, with reference to this deposit. When sinking the shaft a flow of gas was met with at one part of the workings. A sample of this was forwarded to us for analysis and the following are the results obtained on this analysis:

Chemical Analysis.

Carbon dioxide	% 0.13
Oxygen	% 5.37
Methane	% 5.80
Nitrogen	% 88.70

Technical Analysis.

Air	% 25.66
Fire damp	% 5.80
Black damp	% 68.54

Chemist: James Moran.

Mr. Moran in referring to this gas in his report says in part:

"Regarding danger from this gas, we may say that it is dangerous to breathe for more than a few minutes. It is not poisonous, as if carbon monoxide, sulphuretted hydrogen, etc., were present; but its low oxygen content makes it impossible to support life any length of time.

"As to its apparent non-inflammability, this was due to the deficiency in oxygen. There was not enough oxygen present to burn the methane. In our analysis,

we diluted the sample with air and burnt the methane, in estimating it. Dilution with air will raise the oxygen content, and therefore reveal the inflammable nature of one of its constituents. If any ordinary mine air sample contained the same percentage of methane as this sample, it would be highly explosive, but in such cases there is always sufficient oxygen to admit of complete combustion of the methane. The limits of explosibility of methane are from 5.5% to 13%. If the sample submitted is a true sample of the issuing gas, and further evolutions do not exceed this percentage of methane, it is possible of course by proper ventilation to reduce the black damp content to a figure within safety limits, as is the practice in coal mines; for when diluted with very much air the methane percentage of course drops considerably, and although two or three per cent. of methane in mine air is not to be desired as it takes up the place of oxygen, yet an explosion is not possible before 4½ to 5% of methane is present. So dilution of sample with air cannot give an explosive mixture, although it does give an inflammable one.

"We would say in conclusion that most coal mines keep the methane content down below one per cent.; that two or three percent methane is getting to be serious; while, 4 to 4½% is on the limit of explosibility. Also in England, coal mines are forbidden to operate if the oxygen content falls below 19%. In normal air it is 20.93%."

The discovery of this deposit should be of great assistance to engineers in their search for other similar deposits. A careful study of the conditions of the Malagash area may well indicate to those familiar with the Province, other localities where the conditions are similar and where surface prospecting and drilling might offer a reasonable chance of obtaining results.

4. Markets.

a. Domestic.

The importance of this discovery to Canada and more especially to the Maritime Provinces can readily be seen. The only salt producing district in Canada at present is the western Ontario district. Thus Canada at the present time imports over half of her annual consumption. The calculated consumption of salt in Canada in 1918 was 296,328 tons* valued at $2,535,465 as compared with a consumption in 1917 of 301,076 tons valued at $2,041,633. The total sales in 1918 were 131,727 tons, valued at $1,285,039. Of this only some 893 tons valued at $16,743 were exported. There is thus an opportunity for a considerable domestic market for salt to replace the imported material. This import of salt in 1918 amounted to 165,494 tons, valued at $1,267,169 and included: 51,450 tons of fine salt in bulk valued at $294,676; 13,941 tons of salt in packages, valued at $156,736; and 100,103 tons imported imported for the use of fisheries and valued at $815,757. This last item is employed either on the Atlantic or Pacific seaboards in the fishing industry. From a study of the trade statistics of the Customs and Trade and Commerce Departments, I think it is safe to say that about 75% of this fisheries salt is utilized on the Atlantic seaboard including the Gulf of St. Lawrence. The average value of this salt at point of shipment for 1918 was approximately $8.15 per ton of 2000 lbs. The ocean freight rate to bring this salt to Canadian ports of distribution would bring the cost up to at least $10.00 per ton.

This price will probably be a normal price for salt for fisheries for a number of years to come — the price during war time ranging between $15.00 and $25.00 per ton selling price at selling points in Nova Scotia. If, therefore, a deposit of salt can be developed in a centrally located point in Nova Scotia, and a grade of salt produced suitable for the fishing industry a market of some 75,000 tons, valued at $750,000, is available.

In addition to this a considerable demand for salt for domestic uses in the Maritime Provinces could be supplied from such a deposit.

b. Foreign.

Among the foreign markets for the salt from the Malagash deposit the principal ones will be the fishing industry industry of Newfoundland, which consumes, according to reports, about 50,000 tons per year and the fishing and metallurgical industries along the Atlantic seaboard of the United States. It will remain to be seen how much of this latter market can be captured by material produced in Canada.

One feature with relation to the Malagash deposit which is well worthy of serious consideration for future action is the possibility of establishing an industry for the manufacture of sodium compounds. It may well be that, situated as this deposit is, with ready access to shipping facilities both by rail and water, and comparatively close to abundant supplies of fuel, an industry using the salt from these beds as the principal raw material, could be established which would turn out products at a price which could compete in foreign markets such as South America and South Africa with similar material from the English and United States plants.

It will thus be seen that, although the Canadian market alone for salt, or the associated chemical industries, for material produced at this deposit would guarantee its success, its favorable location to water transportation on the Atlantic seaboard will also likely enable it to develop an export trade with the United States, South Africa and South America.

*Figures given in this section are taken from Preliminary Report of the Mineral Production of Canada, 1918. John McLeish, B.A., Mines Branch, Dept. of Mines, Ottawa. No. 506.

Concentrating Mills at Galena Farm Mine Again Operating.

The concentrating mill at the Galena Farm Mine is in operation again and the mine management looks for a steady season's run. A general meeting of the Lucky Jim Mining Company's shareholders will be held at Victoria, B.C., on May 1st. R. O. Whitaker, the American smelting and metallurgical expert, has arrived at Nelson, B.C., to assist in the preparation of a report on the custom rates charged by the Consolidated Mining & Smelting Co. of Canada at its Trail Smeltery. Charles F. Coldwell, prominent Slocan mining operator, who has acquired an interest in properties of the Stewart District, Northwest British Columbia, is in Ottawa with a view to interesting the Federal Government in the construction of a railway from the head of Lynn Canal through the Stewart River section. He is enthusiastic in his predictions of the future importance of this district from the viewpoint of the mining industry.

BEATTY TOWNSHIP GOLD DEPOSITS.

We are advised that arrangements are being made to develop the property of the Cartwright Gold Fields, Ltd., at Painkiller lake, Beatty township. The property has been idle since the buildings were destroyed by fire in 1916. The plant included a 5 drill compressor, hoist and two 60 h.p. boilers. At the time of the fire a 10 stamp mill was on the property. It is said that the machinery can be used again, a comparatively small sum being necessary to put it in good working order.

A shaft has been sunk 100 ft. and about 50 ft. drifting done at that level. It is planned to sink to 400 ft. This work is on the South Claims. On the North Claims exploration will be by diamond drilling, for which tenders are now being asked.

These properties are in the Beatty-Munro area described by Mr. P. E. Hopkins in the 1915 report of the Ontario Bureau of Mines. Claims were staked for gold in Beatty and Munro townships in 1908. Mr. A. G. Burrows mapped Munro township and a portion of Guibord in 1911. Mr. Hopkins mapped Beatty and parts of Warden and Coulson in 1914. The two maps, embracing about 150 square miles, have been incorporated and published as a geologically colored map on the scale of one mile to the inch.

Mr. Hopkins says of the deposits examined: "The gold veins are small and belong to the pyritic-gold type, with transitions to the arsenical type. The study of the veins in the vicinity of Painkiller lake, shows the presence of considerable tellurides associated with the gold. These veins resemble the small gold telluride veins of Kirkland Lake."

"Tellurides were recognized in several small gold-bearing quartz veins in the vicinity of Painkiller lake, on lots 8 and 9, concession V, Beatty township, and on lots 6, 7 and 9, concession VI, of the same township. No doubt they occur and will be found elsewhere in the vicinity. The best telluride specimens were obtained from No. 1 vein on the Treadwell property, lot 9, concession VI, Beatty township.

"Owing to the tellurides being in very fine grains and in close association with the gold, it is difficult to identify them. These minerals occur in fractures in the quartz with grains and seams of gold through them. Certain polished surfaces of the tellurides were examined under a miscroscope with reflected light, special attention being paid to the slight variation in color and the effect after adding a drop of nitric acid. Most of the tellurides have a creamy-white color and after the addition of a drop of HNO_3, turn brown and effervesce strongly, leaving a characteristic etching resembling that of calaverite. There are small amounts of another telluride, light grey in color, which were found to contain bismuth."

Of the Cartwright proper Mr. Hopkins said in his report:

"The Cartwright Gold Fields, Limited, have their main workings on the south shore of Painkiller lake on lot 8, concession V, Beatty. The small quartz vein carrying visible gold, telluride and pyrite runs northward into the lake. A shaft is down 100 feet and work is being carried on at the present time (May, 1915). The old plant and buildings were burned in 1913. The new plant consists of a 3-drill compressor, hoist, and two 60-h.p. boilers. All the machinery in connection with a 10-stamp mill is on the ground and being erected."

In concluding his report on the area Mr. Hopkins said:

"The Beatty-Munro gold area is one worthy of more systematic prospecting. The veins so far found are mostly small, but thorough prospecting may reveal wider and richer ones. Several samples assayed showed the gold to be widely distributed. The veins in the vicinity of southwest Munro are of the Porcupine type, while those at Painkiller lake closely resemble the gold-telluride veins at Kingland lake. The finding of so many gold-telluride veins in the immediate vicinity, viz., Kirkland lake, Maisonville and Grenfell townships, Opasatika lake, Painkiller lake and Deloro township, shows that the gold-telluride minerals are widely distributed, and by further searching larger and richer deposits are likely to be found."

Now that the war is over we may see exploration of this area carried out as recommended.

Mountain Chief Copper Mine.

The Mountain Chief Copper Mine at Renata, B. C., is another property which is expected to be on the producing list shortly. J. W. Evans, president of the company, states that a new tramway has almost been completed and that other equipment will be ready for operation at an early date. Mr. Evans expects that a daily output of forty tons of copper ore will be maintained after a start is made.

Flotation Plant at Granite Mill.

The Eureka Mines, Ltd., operating the Eureka, one of the well-known copper producers of the Nelson District, will have their flotation plant installed at the Granite Mill in a short time. The stamp mill has received an overhauling and the flotation plant is now in Nelson ready to be transported to the property.

Alamo Claims Bonded.

The Alamo Group of six claims on Wolfe Creek, adjoining the Queen Mines, on which important development work is being done by A. W. McCune and associates, has been bonded by eastern interests for $40,000. G. R. B. Elliott put the deal through on the latter's behalf. Mr. Elliott has been investigating the properties for some weeks and seems optimistic as to their possibilities.

Wage Reduction at Rock Candy Mine.

The reduction of 50 cents a day in the wages of miners has resulted in a partial strike at the Rock Candy Mine of the Consolidated Mining & Smelting Co. near Grand Forks. Twenty-nine of thirty-five men left their work shortly after the announcement was made. No more men will be employed at present pending the completion of the concentrator. The grading of the extension of the railway from Lynch Creek to the Mill has been finished and the roadbed is ready for steel.

Developing Property at Arrow Lake.

A large deposit of zinc ore with some showings of galena is situated at Pingston Creek, about twelve miles south of Arrowhead. Further north is a promising copper property. A wagon-road has been constructed to these properties, and considerable development done with encouraging results. The Reneta, a copper property on the Lower Arrow Lake, is again under development on a new bond, on which the first payment of $15,000 has been made.

BELMONT SURF INLET GOLD MINE.

General manager Frederick Bradshaw, of the Tonopah Belmont Development Co., in his report to president Clyde A. Heller, says of the Surf Inlet mine: "The operation of the property of the Belmont Surf Inlet Mines, Ltd., which had been started six months previously, continued throughout the period (10 months ending Dec. 31, 1918), under conditions that were particularly arduous on the gold mining industry. The scarcity of all labor, and especially of skilled mine labor; the higher wages paid and the decreased efficiency of labor; the increased cost of, and in some instances the impossibility of securing supplies, with no advance in the price received for the gold produced, greatly increased the operating cost and decreased the earnings. Notwithstanding these conditions, the Surf Inlet property became the leading producer of gold in British Columbia and the operations for the ten months period, from the treatment of 83,142 tons of ore, resulted in net earnings from operations of $323,242."

The directors of Belmon Surf Inlet Mines, Ltd., are: E. A. Cleveland, Vancouver; M. B. Cutter, Minneapolis; Jos. C. Fraley, Philadelphia; Clyde A. Heller, Philadelphia; Richard G. Park, West Chester, Pa.; Wm. M. Potts, Wyebrook, Pa.; S. Deas Sinkler, Philadelphia; Thomas W. Synnott, Wenonah, N.J., and C. Berkeley Taylor, Philadelphia. C. A. Heller is president; Wm. A. Potts, vice-president and S. D. Sinkler 2nd vice-president, J. K. Kitto is secretary-treasurer. At Surf Inlet F. W. Holler is superintendent, E. W. Hawkins auditor, F. H. Pennlas mill superintendent, and H. J. O'Connell mine superintendent.

President Heller under date of March 26, 1919, says that $45,569 was expended last year for houses for staff employees, school-house, retail store and warehouse, etc. During this year several more cottages for employees, a hospital building and a slight extension of the railroad will be necessary. There was spent last year on development of the Pageley mine, held under option, $7,646, the conditions being unfavorable for progress. A renewal of the option is expected.

General manager Frederick Hawkins says in his report on operations during the 10 months ending Dec. 31, 1918, that the 83,142 tons of ore milled during the 10 months period had a gross content of 39,999 ounces gold, 25,893 ounces silver and 433,399 pounds copper and a gross value, calculating gold at $20 oz., silver at $1.01⅛ and copper at 22,661 per lb., of $924,847. Average value per ton ore was $11.12.

Ore reserves March 1, 1919, were estimated at 385,320 tons. Since then 116,349 tons has been mined, but the reserves increased to 422,761 tons, positive and probable ore.

Mine, mill and power plant operations have proven to be satisfactorily efficient and the improved conditions should soon be reflected in the cost sheets.

Martin Gold Mine.

The shaft on the property of the Martin Gold Mining Company's property, near Amos, Quebec, on the National Transcontinental Railway, having reached a depth of 125 feet, cross-cutting has been carried out and the vein encountered about ten feet from the shaft. At this point the vein is said to be about 13 feet in width, and contains visible gold.

A Montreal syndicate is negotiating with a view to purchasing control of the company.

Reduction of Wages at Trail.

A further reduction in the wage scale paid by the Consolidated Mining & Smelting Company is announced in a recent circular which reads:

Trail, B.C., April 12, 1919.

To the employees:

The average price of copper for the month of March was 14.84c., consequently the wages in the copper mines will be reduced 50 cents per man per day. As arranged in the smelter scale a 25 cent raise was given on July 1st, 1916, which was to remain in force until the mines scales were reduced owing to a drop in the price of metals, and then was to be reduced by an equal amount of one-half of the reduction made at the mines.

On April 15th, 1919, the copper scale will be reduced 50 cents per day, which will call for a reduction of 25 cents at the smelter. It is recognized by the company that the cost of living is still high and, therefore, for the present, at least, the minimum wages will be held at $3.50 per day with the exception of boys and apprentices.

The company has been forced to carry an ever increasing stock of unsold metals, so much so in fact that were it not that many of our employees have voluntarily increased their efficiency we would have been forced to close them.

In recognition of that effort of our employees, while forced to make some of the reduction called for in the wage scale, we will make further efforts to try and finance the production of these metals. We must, however, remind our men that only their best co-operation will make it possible for us to continue operating for any length of time.

Thanking you for your increased effort and trusting that you will give even further co-operation and so enable us to keep the plant in operation till the present critical period is past,

Yours truly,

(Sgd.) S. G. BLAYLOCK,

Assistant General Manager.

Aeroplanes Will Help Prospector.

Discussing the possibilities of the aeroplane in connection with the development of the mineral resources of British Columbia, Captain Alfred Eckley, R.A.F., in a recent address delivered at Vancouver, B.C., said: "The prospector of the future will not spend weeks and months toiling through lofty passes and over forest trails to the distant fields where he proposes to win fortune. He will load himself and his six months grub into an aeroplane, fly over the ranges and land on the spot he has selected. When the season is over the airplane will call again, pick him up along with such ore samples or gold dust he has secured, and carry him back to the Vancouver Chamber of Mines where he can display the results of his work. When he is ready to return with machinery and men the airplane again will be at his service. He need not wait for the government to build roads in order to transport his supplies and plant. The airplane that was designed to carry bombs by the ton to Berlin will be found quite capable of delivering comparatively heavy machinery. It also will bring out ore, for it will pay to transport high-grade stuff 500 miles by air. Thus the development of the airplane in British Columbia becomes the key to the exploration and exploitation of the rich mining deposits of the interior districts, which have scarcely been seen as yet by white men."

Special Correspondence

ONTARIO'S UNDEVELOPED IRON RANGES.

To the Editor Canadian Mining Journal:

Sir,—In your publication dated April 2, 1919, there was an interesting article by Jas. W. Moffat on the treatment of Canadian iron ores, especially those of low grade. This article was both timely and of great importance to the industry.

A portion of this article gave a description of the known iron orebodies in Canada. Among these, the larger orebodies are given as the Helen and Magpie mines of the Algoma Steel Corp.; Atikokan mine, of the Atikokan Iron Co.; the Moose Mountain mine, of the Moose Mountain Co., Ltd. The other orebodies in the older, more populous parts of Canada are mentioned as not being large and of low grade as a rule. A statement was also made that with the exception of the mines mentioned, no really large property has been thoroughly proven to contain one million tons of marketable ore.

In connection with the above statement, if the use of the term marketable ore is applied to the Moose Mountain mine, which is almost entirely a concentrating proposition but turning out a valuable high grade product, the same term should apply and the same allowance as reserves should be made to other large orebodies of a similar nature in Western Ontario. Also the statement that the Atikokan mine of the Atikokan Iron Company, represents the only large proven orebody of this district is, to say the least, misleading, though the additional high grade tonnage is mainly on the range of that name, but held by other mine owners.

On my own explorations, which extend over a period of nearly twenty years and which was given almost exclusively to the study of the Canadian Iron Ranges, I have visited personally over one thousand lineal miles of iron ranges in western Ontario alone, independent of Michipicoten, Magpie, or Moore, Mt., all within rail haulage distance of lake freight as well as being conveniently near existing railway lines. I know of the whereabouts of another thousand miles that would be considered as future reserves of the Dominion, but are at present, too distant from railway transportation.

In the whole of these explorations, while I have found but few large outcroppings of shipping ore, I would consider that in the first thousand miles of ranges there were at least one hundred miles which were worthy of being given the much closer examination which would precede diamond drilling. Outside of this there were large areas which can well be taken into consideration as concentrating propositions.

From west to east the most important iron ranges occur tributary to the Head of Lake Superior,—Steep Rock, Atikokan, Mattawan, Kaministiquia, Loon Lake, Nipigon and Little Long Lake. Less explored ranges are, Hunter's Island, Little Pine Lake, Onamon River and a number of others which extend east from Thunder Bay for a distance of over two hundred miles.

The following tonnages are based on my own surveys and the estimates furnished me by engineers engaged in drill work and other development on the different ranges;

West of Sabawe Lake,—Atikokan Iron Range, 15,000,000 tons, average 55% Iron, 13% Sulph. .03% Phos.

East of Sabawe Lake, Atikokan Iron Co. Mine 10,000,000 tons running 55% Iron, 2% Sulph. .10% Phos.

The Mattawan and Kaministiquia ranges — banded iron formation (Jaspilites) running from 35 to 40% of Iron, 150,000,000 tons which might be concentrated.

Loon Lake Iron Range is estimated as having a total tonnage of 25,000,000 tons.

In addition to the above, on the Mattawan Range there are great tonnage of massive low grade hematite which would be useful in any local furnaces as a mixing ore, running from 35% to 40%.

A considerable proportion of the Loon Lake Ore when hand sorted, would make a shipping, merchantable product, while the lower grades of more massive ores, of which there is a large tonnage on that range, would be well adapted for a local furnace supply.

Extensive tests have been made of the higher sulphur ores on the Atikakon, which gave splendid results. A shipment for experimental purposes, of 400 tons was made and roasted in Wedge furnaces. The analysis of the ore before treatment was 59.34 Iron; .02 Phos.; 2.85 Silica; 21.44 Sulph. After roasting this gave the following product: Iron 65.53; Phos. .02; Silica 3.44; sulph. .59. This test was made from the ores carrying the highest sulphur content on the range, while there is a large tonnage that will run in the neighborhood of 2% in sulphur included in the reserves of the range.

On the Steep Rock Range, which is the thickest and most extensive in that particular district, a small amount of drilling was done at Straw Hat Lake which disclosed a body of hematite of merchantable grade, but as very little work was done on this deposit, estimates are not available.

On the Kaministiquia Range, I recently made a survey of a single outcropping of proven depth which contained over 14,000,000 tons which could be open cut, without taking into consideration a very large tonnage on the same property which would have to be mined. A Government test taken from the outcropping mentioned, of crude ore, the sample weighing about 250 lb. when treated for concentration by jig and water separation and breaking only to quarter inch mesh, gave the following results;

Analysis of crude ore .. ..37.19 Fe.
Ratio of concentration 1-2
Analysis product .. ..53.25 Fe.

A number of hand tests gave an average of 52.96Fe. .09 Phos. and .08 Sulphur from crude ore averaging 33.61 Fe. It is a banded magnetite-hemetite. This ore shews by analysis as follows:

Total Iron 37.19%
Hematite.....Fe_2O_3.....17.19%
Magnetite.....Fe_3O_4.....33.97%

When we consider a proposition of this kind with a 25 mile rail haul and situated immediately on the tracks of two railways, and developed electric power within 6 miles, the advantages this would have over magnetic concentration requiring fine grinding briquetting and a more expensive plant, are evident. In addition to the open cut tonnage already given and the other ore reserves on the same property, we have, within a radius of five miles, the remainder of the 150,000,000 tons mentioned in the tonnage reserves of this

district. This tonnage is easily within the mark.

In the eastern portion of Thunder Bay district, a very small amount of drilling was done on the Onaman River and Nipigon District where there are very extensive iron ranges of great thickness without considering the Little Long Lake range which is of equal importance.

In summing up these ore reserves which are practically on the railway tracks and easily within the limit of haul by rail, it would seem that eastern men in compiling statistics, etc., have practically shelved this district altogether. In my opinion, it is really the most important point in Canada as regards iron ore reserves.

In the New York Mining and Engineering Journal dated June 22, 1918, they published an estimate of the iron ore reserves of the world. This statement gave Canada as follows: "**Not estimated, scattered and relatively small.**" Is not this a splendid advertisement for our iron ore reserves? Many of our Canadian engineers and our Mines Department men seem to be imbued with much the same idea.

While it is true that the Nova Scotia Iron and Steel companies can get unlimited supplies of ore from Wabana, N.F., other steel plants or smelters are dependent on account of the shipping distance, on other reserves.

I quite agree with Mr. Moffat in his statement that it is much easier for the Canadian furnaces to simply write any iron company in the United States where they can get any grade or class of ore desired, be sure of its prompt delivery and of its being according to the analysis guaranteed them when making their selection. They also only pay a duty of eight cents per ton and no war tax, while the local producer of ore would have to sell on the same market basis, but would pay a war tax. This might not seem patriotic on the part of the furnace man, but it is business.

On looking over the iron and steel production pamphlet issued by the Government, the following figures are very interesting:

In 1912 we imported from the United States alone, $82,658,294. worth of Iron and Steel Products;

In 1913,—$106,610,390.;

In 1914,—$76,702,283.;

In 1915,—one of the quietest trade years that Canada, had for a decade, $48,411,020.

Making a total for the 4 years of $314,381,987.—an average of over $78,000,000 annually.

That none of this was required for war products was evinced by the import from the United States in 1916, the first year that Canada actually started dealing largely in munitions, in that year we imported $95-165,875. This gradually increased until it amounted to over $150,000,000. These are staggering figures and in, as Mr. Moffat expressed it, what the Canadians point to proudly, as their growing years.

I do not know what the import will be for 1919. but we notice statements in the papers that the various Canadian steel plants are going to the Government soliciting orders. Why have they not taken care of some of this huge import in past years? Are they taking any steps to manufacture this import in future years? It seems very doubtful. They seem content to run along turning out standard grades in classes of material for which they probably require less elaborate machinery and a smaller plant than to cater to what might be termed, mixed trade, which is much the same reason why the Canadian furnace owners buy American ore, that is — a matter of convenience.

In 1916, of twenty furnaces in Canada, only fourteen were in blast for varying periods of time, yet in the years 1913, 1914, 1915, 1916, we imported from the United States, $5,496,639. worth of pig Iron. There is practically no production of structural steel in Canada and only a very small tonnage of plates. In accordance with this program, the blast furnaces and steel plants of Canada have an annual output of about $100,000,000 and we have an annual import of iron and steel products of over $78,000,000. Surely there is some remedy for this!

Very few of the Canadian blast furnace owners have made any special effort to get a supply of Canadian ore, at least as far as the Thunder Bay District is concerned. It is quite true that they need various grades which they can purchase quite easily in the American Market, also that the Canadian output might not all be quite up to their requirements, and that they would still have to import a small percentage, but there is no necessity for importing over 90%.

I might add that the Government tried the plan of paying a bonus on pigiron produced in Canada with the result that as the operator of the mines did not get any encouragement there were no new mines opened up and the furnaces imported their ore from the United States and collected the bonus.

In connection with our iron fields, the work done by the U. S. Steel on the Atikokan Iron Range was the largest amount of drilling in any one section in Canada, and in the whole of the Thunder Bay District this work would represent more than nine-tenths of the drilling done. There has not been even a close, detailed survey made of our iron ranges by Government engineers, or engineers representing outside interests except on the Atikokan Range.

The principal reason why few large iron orebodies have been found is that no one has taken the trouble to explore for them. This would necessarily mean a very expensive survey followed by a certain amount of surface and a very considerable amount of diamond drill work, and it stands to reason that neither the explorer nor the average owner can afford to do this and here I am speaking from experience. Until some special inducements are offered or Canadian furnaces and steel plants go after a supply of their own, there is little likelihood of the Canadian iron and steel industry, which should be the most important individual industry in Canada, making any great strides.

The Federal Government is now being asked to give a bounty on iron ores produced in Canada, said bounty to be paid to the operator of the mine. Almost the only adverse criticism seems to be the amount of money that the Government might be called upon to pay out for this purpose. In connection with this I would point out that the average market value of iron ore at present prices, Lower Lake Ports, is nearly $5. per ton. This would be about $4. f.o.b. at the Head of the Lake Superior, which would mean that if 50c per ton bounty were granted, eight times that amount would be spent in Canadian territory in opening up iron ranges and the Government would actually receive back manifold in taxes, etc. what they paid out, besides gaining enormously in increased traffic for the Canadian National Railways which tap 75% of the Thunder Bay and Rainy River District iron ranges, and the hundreds of miles of ranges which we have within easy shipping distance would be carefully looked over and diamond drilled. From my personal observation I feel quite

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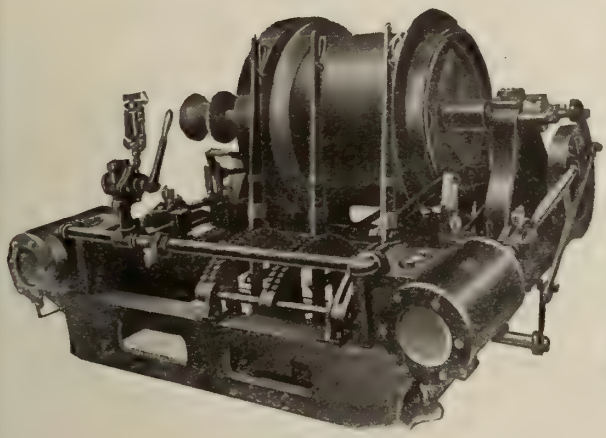

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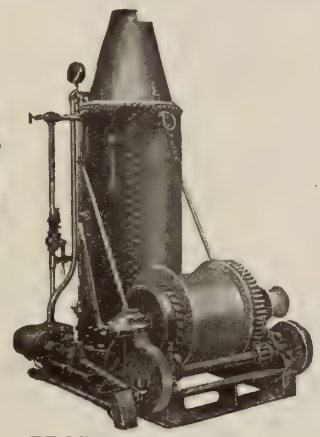

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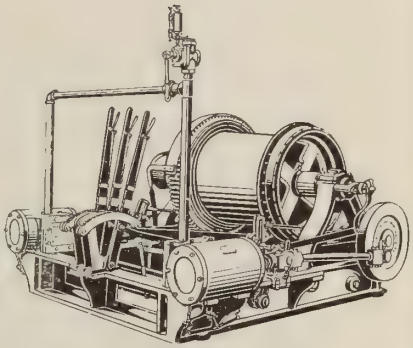

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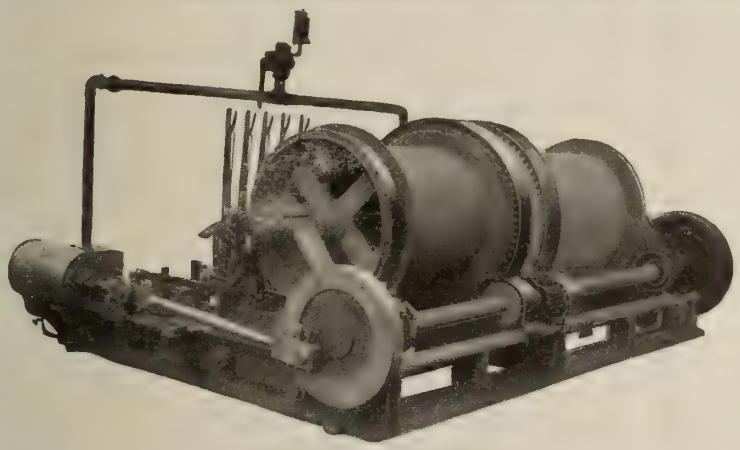

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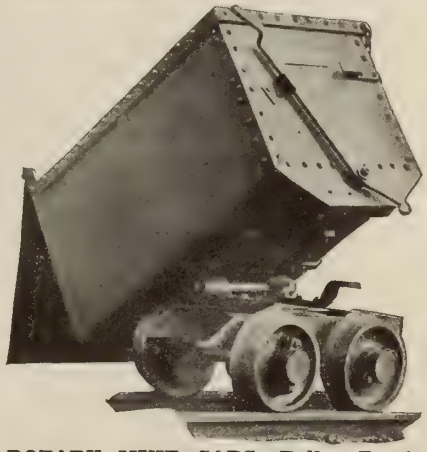

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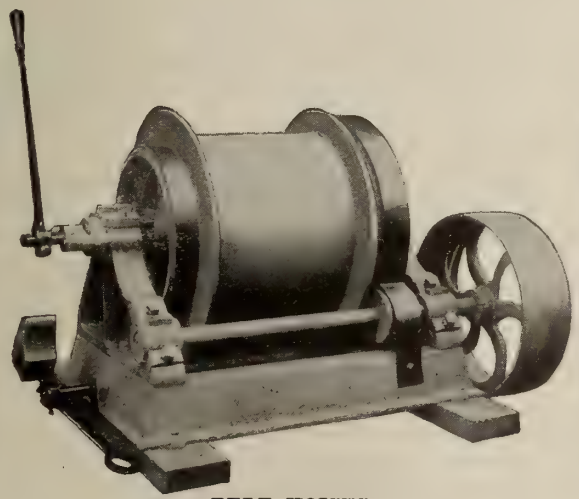

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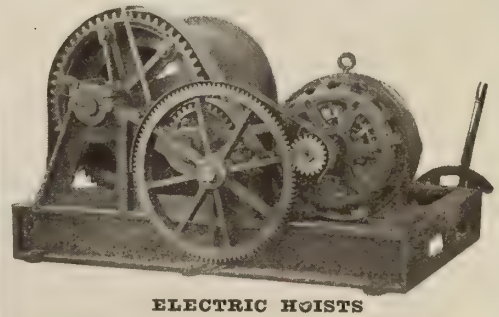

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safe in making the statement that many of these ranges are quite likely to produce great tonnages of iron ore. Even this program would only partially meet the great deficiency.

Duluth solved the problem for the Western States iron and steel supply by building a $25,000,000 plant, which last year they had to increase to $40,000,000 to meet the demand. American iron and steel purchasing agents inform me that Duluth can shade Pittsburg prices. Local purchasers of heavy steel also inform me that if they could buy their material at the Head of the Lakes, they would save at least 8% on freight charges alone, even if purchased in Duluth or Sault Ste. Marie and the saving in freight charges from Eastern plants would be at least 20%.

Our steel plants must be enlarged to meet the requirements of a growing country and do away with the tremendous import in iron and steel products and the necessary tax which the community pays in duties, etc.

The policy of the men who are doing such splendid work for re-construction, headed by Sir John Willison, is the building up of Industrial Canada. Many of the war workers and also men who went overseas, have become trained mechanics. The result of this policy of re-construction would be to keep these men where they belong, in Canada, and not have them leave for points in the United States or elsewhere to find work for which they have been specially fitted and trained. The returned soldier should have the first consideration by giving him remunerative employment as well as keeping him at home. The average wage paid by the U.S. Steel Corporation is about $4.10 per day. This item alone and the immense import of iron and steel products, is sufficient argument for adding nearly 75% to the capacity of the steel plants of Canada.

A steel plant at the Canadian Head of the Great Lakes would solve the problem for the whole of western Canada, for we must consider that while the population of Ontario and Quebec in increasing very slowly, the population of the Great West is increasing by leaps and bounds and there is room for many more millions to be added to the Western Provinces. The proven iron ore reserves of the Thunder Bay district alone with its various grades, would supply a plant of any size for any number of years.

Even Government aid in the payment of a small interest on the actual expenditure would be a splendid investment.

It has been pointed out by various men that the Government would be entering into competition with private enterprise; but as an absolute offset to this statement is the fact that the Port Arhur Shipbuilding and Dry Dock Company and others draw from 3% to 3½% on a large portion of the investment for terms varying from 20 to 25 years from the Government. Moreover the steel plants in the east were heavily subsidized in the past. Why not assist the establishment of an iron industry at the Head of the Lakes to supply the present and ever increasing demands of the west, at a great saving in freight alone on any iron and steel products that could be brought in by either rail or water?

We can always get coal delivered at the Head of the lakes at a freight charge of 50c per ton or less, so the fuel problem, as connected with smelters or steel plants, is easily solved. The great Hydro electric development in the Thunder Bay District answers all questions regarding power.

Yours, etc.,

J. E. MARKS.

Port Arthur, Ont.
May 5, 1919.

Governmental Exploration for Mineral Deposits.

With regard to a scheme for governmental exploration for mineral deposits, as has been recently suggested by the secretary of the Canadian Mining Institute, there will probable be many difficulties to be encountered should such a plan be adopted.

The prospecting fraternity is made up of a type of men who may always be willing to listen to the suggestions of mining engineers, but, perhaps fortunately, do not accept such opinion as being conclusive or infallible. The average prospector would perhaps smile broadly at the suggestion, that when placing his discovery post, he should receive his instructions from a mining engineer. Among prospectors it is a generally accepted belief that mining engineers are not a success in the prospecting field. This does not infer that all due respect is not accorded the mining engineer in his capacity of being able to efficiently conduct the affairs of mining operations and systematize his efforts in endeavoring to arrive at the merits of discoveries made. But it does mean that mining engineers by the wholesale passed the Kirkland Lake area up as being worthless, many of them turned their backs upon Porcupine, as well as Cobalt and Boston Creek, and for this reason the prospectors seem justified in being guided in a large measure by their own judgment.

Geologists and mining engineers have performed genuine service in this country, in that they are able to point out areas where the geological conditions are favorable, and where certain mineral is liable to occur. Beyond this point, the prospectors have led the way. By sheer optimism—sometimes referred to as almost blind optimism, they have won out. A noteable instance of this kind is shown in concrete form in the rich Lake Shore mine where the optimism of Harry Oakes, former prospector and now president of the Lake Shore Mines, placed his every dollar and won success.

The writer is of opinion that the suggested scheme would not prove to be a success. Nevertheless, unless or until some such a scheme should receive a fair trial it would be very unfair to condemn it at this time. A careful experiment of the nature might not be remiss, as it would at once have the commendable advantage of affording employment for returned men and would determine the merits of such a plan. In the meantime prospecting along the usual lines by individual prospectors would not be interrupted.

Electric Haulage at Crown Reserve Mine.

The electric haulage system recently installed at the Crown Reserve mine is working satisfactorily, according to official information. As a result, the efficiency of underground operations has been increased considerably.

Although the electric haulage system has been in practice for several years at the Hollinger Consolidated, and for more than a year at the McIntyre-Porcupine, the present installation at the Crown Reserves is the first of its kind in the Cobalt mines.

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Temiskaming and Hudson Bay.

The Temiskaming and Hudson Bay Mining Company, the first mining company to take up holdings in the Cobalt silver camp is surrendering its charter.

The company was incorporated by a number of New Liskeard men, prior to the discovery of silver in Cobalt. With an authorized capital of but $25,000 divided into 25,000 shares, and with only 7,761 shares issued, the T. & H. B. Co. has established a dividend record that probably exceeds that of any other precious metal mining company in the world. From the sale of the old Silver Queen mine, part of its holdings, it was able to disburse a first dividend of 200 per cent. on November 6th, 1905. This was the first dividend declared by any company operating in Cobalt. The subsequent successful operation of the principal holding resulted in dividends of about twenty-five thousand per cent. being paid to shareholders. Whereas at the beginning, the shares of this company are said to have changed hands at a few cents per share, they ultimately rose to around $300 a share.

In 1909 the Hudson Bay Mining Company was formed with an authorized capital of $3,500,000, as operating company, and the T. & H. P. B. Co., became the holding company. The surrender of the charter of the latter concludes the plan decided upon several years ago.

Dome Mill.

According to official information, the mill of the Dome Mines did not resume operations during the last week in April as had been hoped. It has been found that the resumption of milling operations following a period of eighteen months idleness is a task entailing much more labor than had been expected. However, within the next week or ten days the mill should be running at a moderate rate.

It is learned that very little difficulty is being experienced in securing the desired technical staff and everything points toward the probability of a rapidly increasing output following the actual commencement of milling operations.

Porcupine-Keora.

Diamond drill hole No. 6 is being started on the property of the Porcupine-Keora, situated in the northern part of the township of Whitney.

During the course of the large amount of drilling done on the property, very encouraging results have been encountered.

The Kirkland Road.

Concerning statements being made with regard to the controversy relative to the best method of transportation to the mines of Kirkland Lake, it is erroneous to say that the mines supporting the motor road propaganda in preference to a steam railway are those already equipped with mills. Indeed, one of the strongest advocates of a motor road is the Wright-Hargreaves which company has the largest construction program before it of any of the mines in the field.

The advocates of a steam railroad, for some reason or other, are composed chiefly of holders of outlying or perhaps undeveloped claims, and who are not in a position to weigh the merits of the case with equal ability as are those who are at the present moment actually faced with the problem of finding the most efficient solution.

North Dome.

Concerning reports from Porcupine that an American syndicate, composed of Buffalo interests, has acquired the North Dome mine, and that occupants of buildings on the property have been notified to vacate by May 1st so as to provide accommodation for employees that are to be engaged at once, nothing official appears to have been given out.

The North Dome was acquired several years ago by the Temiskaming Mining Company of Cobalt, and no intimation of the property having been disposed of to an American syndicate had come to the company's office here, as yet.

The James Bay Survey.

At a time when the Ontario Government is arranging to send a survey party into the James Bay district for the purpose of further looking into the advisability of extending the Temiskaming and Northern Ontario Railway to tidewater, a good deal of interest attaches to the program to be pursued, and much speculation is rife as regards the probable personnel of the expendition. The survey will be one of the most important ever conducted in Northern Ontario, and it is considered probable men well versed in the North in its untamed condition will be chosen for the work. On a matter of this kind it would be exceedingly easy to perpetrate irreparable blunder if such a task were to be committeed to men not armed with thorough and proven experience.

In that wild world of territory practically unexplored, conditions will be met that might well dampen the spirit of a tenderfoot. Muskegs, mosquitoes and blackflies, loneliness, inclement weather and a dozen other things incidental to the trip will all operate as factors contributory to discouragement.

It has taken a full century to tame a narrow fringe of Northern Ontario. The balance will not be mastered in a day. And so, on the eve of the departure of the vanguard of those commissioned to take this first important step in the search for a highway to the northern seas, interest in the undertaking, and anxiety over its thoroughness may properly be termed a virtue on the part of citizens of the North, and in no way does it reflect lack of confidence.

Broad as the Northern field already is for new enterprise, the scope thus added by the construction of a railroad through such a territory should present excellent opportunity for big important concerns which are always on the alert for fields which permit free opportunity for expansion.

Canadian Kirkland.

A meeting of the shareholders of the Canadian-Kirkland Gold Mines is to be called at an early date for the purpose of considering, and if approved, ratifying an option agreement whereby control of the company will pass to the Crown Reserve Mining Company.

It is understood the situation is such as to assure no hitch in the transaction, the directors having already agreed and now only await ratification by the shareholders.

The Crown Reserve is already proceeding with arrangements to carry out a comprehensive exploration and development programme. Effort will be centered largely on the development of vein No. 2, which shows a very substantial width, with commercial ore occuring in certain sections.

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Gold Reef.

An examination of the Gold Reef mine is being made, preparatory to carrying out an exploration and development program. It is understood an engineer has been already engaged for the work.

The Gold Reef is situated in the township of Whitney, a short distance north from Porcupine lake. It is about in a direct line between the Dome Mines on the South-west and the Porcupine-Kerro on the north-east. During its early development, some spectacular ore was encountered in a narrow vein.

Dolly Varden Company Reported to Have Admitted Claim of Taylor Co.

Victoria, B.C.—The affairs of the Dolly Varden Mining Company promise to reach a settlement without loss of time. It has been reported authoritatively that the company admits the claim of the Taylor Engineering Company, which amounts to $462,628.

This was expended in the construction of eighteen miles of railway from tidewater in the Alice Arm District, British Columbia, to the Dolly Varden Mine. Payment of the sum must be made to the Engineering Company within thirty days, and it is taken that the admission of the claim is an indication of the Company's readiness to settle within that period. If this is so the title to a good mine as well as to the railroad which taps some of the richest mining country in the Northwest will be cleared, the company will be in a position to sell or to operate, and activity and prosperity should return to the section affected. The Taylor Engineering Company, too, will be able to pay its creditors, among whom are one hundred odd workmen who were engaged on construction and who have been impatiently waiting for their wages.

Government Prospecting in British Columbia.

Charles Camsell, British Columbia representative of the Dominion Geological Survey Department, who has just returned after a two months visit to Ottawa, states that interest never was keener in mining in Canada. The Dominion Department of Mines, he says, appreciates that everything possible should be done to encourage this optimism and one matter which he has under consideration, and which he is supporting, is that prospecting parties be sent into British Columbia territories which indicate the presence of minerals by their location and formation. Upon good strikes being made the Government, according to this proposal, would supply the money for the development work up to the proving point and then the property would be put on the market and the Government reimbursed out of the revenue from the sale. "In this way," Mr. Camsel explains, "many soldiers who have signified their intention of living in the open in preference to returning to offices could be supplied with work of a congenial and healthy nature. At the same time the mineral resources of the province would be developed and the country would receive direct returns for its investment." Even if the Government does not take this step Mr. Camsell predicts that there will be many independent prospectors go to the hills on their own account, prefering the freedom of the mountains to the confinement of clerical duties.

Miner Killed at Harewood Mine.

Henry Clark, a Nanaimo miner, was killed recently by a fall of coal in the Harewood Mine, Canadian Western Fuel Company.

:-: EDITORIAL :-:

PROSPECTING BY RETURNED SOLDIERS.

Returned soldiers are offered financial assistance if they choose to engage in farming. Should not those who prefer mining be given similar assistance?

If it is admitted that the soldier should be allowed to choose for his occupation prospecting for minerals instead of clearing and tilling the soil, it behooves mining men to suggest how such assistance should be given. Obviously, the difficulties are greater in this case than in agriculture; but there must be some satisfactory solution and it will be found if we look for it diligently. The solutions that have been offered are not considered wholly satisfactory, but they are valuable, nevertheless. They should bring out discussion and lead to good results.

One thing that strikes us is that the prospectors have not yet given voice to their opinion regarding assistance to prospectors. We would be not a little surprised if they looked very favorably on some of the plans that have been proposed, in which it is provided that government prospecting parties should be in charge of engineers. It seems to us that the proper persons to place in charge of prospecting parties are experienced prospectors. Mining engineers who have had considerable experience in prospecting would be well qualified for the work, but great engineering ability is not so necessary as well developed powers of observation, and a love for the work. The engineer has his place, and it is a very important place, in the mining industry; but the prospector is generally better qualified than the engineer for his particular work. It is no great discredit to the engineer that he seldom makes discoveries in new fields. It is no discredit to the prospector if he cannot survey a stope or design a hoist.

The prospector can get much assistance from the engineer, and perhaps more from the geologist. It does not necessarily follow, however, that the prospector does not bring to his work any tools of his own. His ability to utilize the work of the geologist and the engineer does not make him a subordinate individual by any means. Why should we assume that there are not among the prospectors men capable of leading prospecting parties?

If the government is to assist prospectors, should there be any strings attached to the title of properties staked while in receipt of such assistance? It seems to us that the fewer restrictions placed on the prospectors the better. We know that there would be objections raised if the prospectors were allowed to have a perfectly free hand. Nevertheless, we are disposed to believe that the best plan would be to give each soldier an outfit, a season's supplies and a little money, and let him go wherever he pleased like any other prospector. Every assistance in the way of advice should be tendered him; but he should not be required to accept it.

It is probable that some recipients of government "grubstakes" would not do good work. There would be some waste, but possibly not as much as a staff of supervisors would cost. In any event, we should remember that we are paying these men for what they have done for the country rather than for what they are going to do. Their own interests will direct most of them to spend a reasonable portion of their time in the search for minerals, provided they are to receive full title to their discoveries. The government, like every individual who puts up money for prospecting, will have no guarantee of returns.

THE UNDERSEA COAL-FIELD OF CAPE BRETON ISLAND.

A very lively interest is being taken throughout Nova Scotia in the legislation now before the House of Assembly in Halifax which is designed to empower the Commissioner of Public Works and Mines "whenever he deems it expedient to inquire into and concerning whether any worked or unworked submarine coal mining area, held under lease and subject to the provisions of the Mines Act, can, if unworked, be advantageously work, or if worked, be more advantageously worked in the best interests of the Province by some other lessee of coal mining areas that are subject to the provisions of the 'Mines Act' and to report thereon to the Governor-in-Council with any recommendation he may think fit."

The attitude of the Government of Nova Scotia toward the submarine coal lease question was indicated during February in a statement made by the Commissioner of Mines to representatives of the Press. Mr. Armstrong said:

"Many of our valuable deposits are under the sea. Obviously, the extent of these measures is difficult to determine. In each of the four well-known coal basins in Cape Breton County, around Sydney Harbor, the various seams dip from the land out under the Atlantic Ocean with wonderful regularity. Many of the mines of The Dominion Coal Company, and of the Scotia, are being operated under the sea, in some instances probably two miles from the shore. When it is known that submarine coal seams are today being successfully extracted at a distance of over five miles from the shore, and as the fringe of our areas is but touched, the possibilities are enormous. The problem of extracting the coal, from an engineering standpoint, is an interesting one. *The key to the development of these areas is naturally dependent upon the contiguous land areas.*

"As the development of these underseas areas proceeds it is becoming apparent that the policy pursued in the past of laying these areas out on the same principle as that applicable to land areas, is open to challenge. Unless arrested and altered, the future development and operation of some of these areas will be difficult and economically impossible. These difficulties were not foreseen at a time when the value of these areas was less appreciated than today. The conservation of these valuable deposits is essential in the public interests, and only the very strongest of reasons should be admitted to prevent the application of a speedy remedy. This applies more directly to the submarine areas off Sydney

Harbor than elsewhere. It may be necessary to review and re-survey this whole territory and re-adjust existing lines and boundaries in such a way as to ensure such a disposition of these areas as will guarantee the future extraction of this coal, upon the most natural, equitable and scientific lines possible. The time has probably arrived for some such action. It can be accomplished, I have no doubt, without inequitably disregarding or unfairly disturbing existing interests or rights."

The necessity for legislative action in this matter has, as is well known, arisen from the application of the Nova Scotia Steel & Coal Company for permission to extend its collieries into the solid coal surrounding the undersea workings, and the objection of the Dominion Coal Company as lessee of the coal in question.

BETTER ROADS FOR MINING CAMPS.

In this week's issue of The Journal, two Government announcements of particular interest to Northern Ontario are made. First, is the announcement that a motor road will be built for the benefit of the mines of the Kirkland Lake field, and, second, that the Government has taken over the ore sampling plant of Campbell and Deyell's, and will operate the plant for the general benefit of mines in the north.

The decision to construct a motor road from Swastika to Kirkland Lake is in compliance with the expressed wishes of the leading property owners in the district. It is believed the cost of the road will approximate $72,000. In the subsequent development of mining properties farther east, should success be achieved, an, also, should the Larder Lake district develop successfully, there would then be much in support of constructing a railway from Swastika to Larder Lake by way of Kirkland Lake. As matters now stand, the proven mines of Kirkland Lake are only from four to six miles from the present main line of the railroad, and, travelling by motor bus over a first class road should not occupy more than from twelve to eighteen minutes. Passengers and freight may thus be landed directly at their destination, and a flexible service for travelling at any hour of the day or night will thereby be provided, as compared with perhaps not more than two trains daily if a railroad were to serve the district. The announcement that the Government has decided to assist mining interests of the north by taking over and assuring the continued operation of the only independent ore sampling plant which serves the mines of Northern Ontario will be welcome news for those engaged in the north's mining industry.

The attitude of the Ontario Bureau of Mines in taking cognizance of the reasonable requests of mining interests for assistance in matters of this kind, is going the full limit in serving the best interests of the mining industry. The Department commands a full measure of request in the entire field of its activities, by reason of just such general response to the earnest requests from those localities and that part of the country's industry which falls within the scope of its jurisdiction.—J. A. McR.

Cork-Province.

After having been closed down since last November, because of the failure of water for milling purposes, the Cork-Province Mines, Ltd., south fork of Kaslo Creek, have resumed development.

THE ANTICS OF SILVER.

Released from the bonds of government control, and in greater demand than ever before during the past quarter century, the quotations for commercial bar silver have been fluctuating violently during the past week. In the position of having to find a price level, based entirely on the law of supply and demand, the antics of silver quotations is baffling not a few of those well versed in the precious metal trade. Sooner or later the quotations may reasonably be expected to get into a more or less even groove, but, for the present, conservative mining interests refrain from offering opinion. That the price will rule high for several years is confidently expected. In the Cobalt field the trend of the metal market, it is believed, will encourage additional exploration work on idle properties as well as in the idle areas of the present producing mines.

The Dome Report.

The eighth annual report of the Dome Mines contains no important surprises. The most significant feature, perhaps, is the fact that underground facilities for handling ore will now make it possible to handle about three thousand tons of ore and waste in two shifts of eight hours each. This is considered to be particularly significant, in that the present milling facilities are good for treating only about one-half that amount of ore. The interpretation placed on this in some quarters is that an early increase in milling equipment is under contemplation.

Other features are the facts that no ore was developed below the 800-foot level, the deeper workings having been carried out in connection with the ore handling system and not for exploration. Diamond drilling, at 1,150-ft. level, however, indicated considerable ore. The surplus as of March 31st was $56,801.26, as compared with $524,797.76 one year ago, a decline of $467,996.50 during the year, owing to the large amount of work done while the mill was non-operative.

The fact that the report was in the hands of shareholders just four weeks following the close of the fiscal year, is generally looked upon as ample proof that shareholders are to receive every possible consideration. The attitude of Mr. Basche, president of the company, is creating a favorable impression in the north. Not only does the report cover operations during the past year, but indicates as clearly as is humanly possible the probable course of working during the coming months.

It is interesting to note that whereas ore reserves are estimated at close to two million tons, the general manager, Mr. Kaeding, declares some four years' ore is in sight. This would indicate the expectation of being able to treat about 500,000 tons annually. The ore reserves have previously been estimated to contain $5.10 to the ton, and it follows a production of about $2,550,000 would be shown annually. Provided costs are maintained at about the pre-war rate, a net profit of some $1,250,000 would be shown per annum, or equal to about 31 per cent of the company's $4,000,000 issued capital.

The mill has resumed work this month on a moderate scale, and is rapidly being speeded up to 600 tons daily, following which it will gradually be brought up to full capacity of about 1,350 tons daily. Maximum production will probably not result for some little time, but now that a beginning has actually been made, the future outlook is satisfactory.

A CORRECTION.

To the Editor of the Canadian Mining Journal:

Sir,—The writer has frequently been irritated by the evident inaccuracies of the daily press when dealing with figures of any kind. Almost daily one sees figures in the heading of a news item which cannot be reconciled with those given in the text below. This might possibly be excused by the daily rush to have the paper printed and the wide range of subjects with which a newspaper deals. It is a different thing, however, when a supposedly respectable and sober technical journal treating of matters in its own sphere tries to force down its readers the statement attached. It cannot be explained as a clerical error or misplacement of a decimal point. I for one will not allow you to remain under the delusion that you have got away with it. You stand unmasked!

Yours, etc.,

THOUGHTFUL READER.

Toronto, May 9th.

The following appeared on page 289, April 23rd number: "The gold production of the province (Nova Scotia), during the period of the war has been but a few thousand ounces. The total gold production of Nova Scotia from 1862 to 1917, was 956,497 ounces from 2,187,493 tons of ore crushed, which shows the high average yield of 2.28 ounces per ton."

The average yield was, as might be estimated from the total tonnage and yield, about .45 oz. per ton or a little under $9.

PLACER MINING IN CARIBOO DISTRICT.

Victor Dolmage, of the Geological Survey Department, Ottawa, has issued a report on the Cariboo Gold Fields in the summary of which he states that, with the completion of the Pacific Great Eastern Ry., there should be a marked rejuvenation of the placer mining industry of the Cariboo. Last summer he spent some time in a reconnaissance survey of the district and in visiting the various placer mining operations in the area. Last year's gold output was only $82,000, as compared with the average of recent years of $200,000. Shortage of labor and depreciation of the purchasing power of gold are given as reasons for this decline. Of the $75,000,000 produced by the placers of this Province Cariboo has produced $45,000,000, the greater part of which was recovered between 1860 and 1878 when the rich accessible parts of the stream beds were mined. The Cariboo Gold Fields embrace 7,000 square miles and lie within the bend of the Fraser River between the C. P. R. and the G. T. R., the mining centre being Barkerville, 230 miles directly north of Ashcroft. The area may be reached by motor from Ashcroft or by steamer from Prince George. Practically all the promising placer ground in the Barkerville area has been staked, though, owing to present conditions, the majority of the claims are idle. Mr. Dolmage believes that an improvement in transportation facilities into the district would stimulate prospecting along the creeks. There is a possibility of an increase of mining of the deep ground along numerous creeks. Prospecting with Keystone drills has given satisfactory results, but the excessive pressure of underground water has made the exploiting of the deposits by drift mining impossible as yet. Much of the ground is suitable for dredging. The distance from the present railways makes the cost of installing machinery high and constitute a handicap to development.

NIPISSING.

In his monthly report to the President and directors of the Nipissing Mining Company Manager Hugh Park says:—

"During the month of April the company mined ore of an estimated value of $219,927 and shipped bullion from Nipissing and custom ore of an estimated net value of $305,989. Favorable developments continued to be encountered underground, particularly on veins 99 and 109 at 96 tunnel. All producing faces at shaft 73 continued to be satisfactory. Vein 99, being developed through the workings at 96 tunnel, showed great improvement during the month. This vein had previously been drifted on the tunnel level for some distance, showing approximately one inch of 1,000-ounce ore over a length of fifty feet. A winze was recently started and a test level was established at 50 feet. At a distance of 25 feet from the winze the vein widened from almost nothing to one inch of high-grade ore, alongside of which was one-half inch of matted wire silver. Several rounds have since been taken out and the vein is improving in width.

"Vein 109, also worked through 96 tunnel, continued to be satisfactory throughout the month, 130 feet of drifting having been done to date, over which distance the vein averaged two inches in width and 3,000 ounces to the ton in assay.

"Veins 99 and 109 will shortly be developed by a level at 90 feet below the tunnel. An old winze has been pumped out and cross-cutting to the vein will commence immediately.

"At shaft 73 no new veins were encountered in any of the cross-cuts. Developments on vein 544 were only fairly satisfactory throughout the month, due largely to much faulting. At times the vein has been four inches in width, but of low value. Some raises have been commenced, and if these prove to be satisfactory a level higher up will be started.

"Drifting and cross-cutting have been started at the second level of 64 shaft in a area some distance to the north of 64 vein. No favorable developments were encountered at shafts 63 and 128. The low grade mill treated 6,343 tons of mill rock and 169 tons of high grade ore. The refinery shipped 301,458 fine ounces of bullion."

Want Grant for Electric Smelter.

A delegation waited on Premier Oliver, of the British Columbia Government, and asked that a loan of $300,000 be arranged to permit the installation of a Rothern Electric Smelting Plant in this Province. Representatives of those who control the smelter patents were supported by Mayor Vance, of North Vancouver, B. C.; Reeve Fletcher, of Port Grey Municipality, B. C., and other prominent citizens. The Premier gave the delegation a hearing and promised that a report would be obtained on the process immediately on the return of Hon. Wm. Sloan, Minister of Mines, who is in Eastern Canada at present. Samples of steel were shown which, it was claimed, were produced from magnetite ore, of the kind to be obtained in quantity in this province, during the space of four hours. The Government was informed that the Rothern furnace now is situated near Seattle, Wn., and that a favorable consideration of the request would secure the industry for British Columbia. It is understood that, in addition to the loan, the principals would ask for a free site and other miner concessions.

Nova Scotia's Side of Coal Area Question

A statement regarding the question of undersea coal areas in Cape Breton has been given out by the Nova Scotia Steel & Coal Co. It is as follows:

The statement of the Dominion Coal Company, in opposing the proposal made by the Nova Scotia Company, that an exchange of undersea coal areas, should be brought about by legislative action, assumes throughout, that such an exchange would lessen the value of the equities upon which the stock and bond issues of the Dominion Coal Company have been secured, and would lessen the reserve tonnage of metallurgical coal required for the future operation of the Dominion Steel Company.

No such effect could possibly follow the exchange of undersea areas which is proposed by the Nova Scotia Company, as would very readily be seen by an impartial mining engineer who would take the trouble to examine the nature of the proposed exchange.

Far from decreasing the reserves of the Dominion Coal Company, the exchange suggested would increase by several hundreds of millions of tons the available metallurgical coal tonnages of the Dominion Coal Company. Not only would it do this, but it would prevent the Dominion Coal Company from being compelled some years from now to abandon a number of undersea collieries when the workings reach the limits of the Dominion Coal Company's present undersea leases, and encounter the outer leases of the Nova Scotia Company, some two miles from shore.

The proposal made by the Nova Scotia Company does not refer in any way to the so-called, "blanket lease" of the Dominion Coal Company, which was the product of special legislation and upon which the securities of the Dominion Coal Company are floated.

The "blanket lease" (sometimes called the Whitney Lease of 1893), represents the consolidation of a number of individually owned properties, which were amalgamated to form the main coal asset of the Dominion Company. The most valuable part of the "blanket lease" consists of coal seams underlying the **land**, in which only the upper coal seams have been worked to any important extent. The land areas of the Dominion Blanket Lease constitute a magnificent asset, but its seaward extension is insufficient, seeing that over the most important frontage, namely that now being operated upon by the Waterford collieries, it is limited to two miles in a seaward direction.

A seaward extension of only two miles is insufficient to enable the maximum output to be won from the shore openings and, under the conditions of mining practice as understood to-day, the first thing an engineer would seek, before planning undersea collieries, in such a coal area as exists at Waterford would be to secure **all** the coal seawards.

Coal is being successfully mined off the Cumberland coast in England at a distance of 5 miles from shore. The Nova Scotia Company, operating only a few miles from the Waterford collieries, is mining coal 2 1-3 miles from the shore, and has made every preparation to continue the mining of coal indefinitely seawards.

The refusal of the Dominion Coal Company to consider the exchange proposals, is in effect a refusal to accept the opportunity to remedy the shortcomings and weaknesses of the "blanket lease." If the Dominion Coal Company were to examine impartially the proposal of the Nova Scotia Company, it would see that an opportunity was presented to acquire an area of metallurgical coal, of undoubted quality and extent, which would indefinitely prolong the life of the four new collieries now operating at Waterford and of several other collieries, which will some day be developed in this district. The whole argument of the Dominion Coal in opposition is based on the belief that the proposed exchange is inequitable to the Dominion Company, and on this belief it bases a plea for the protection of its vested interests and financial obligations.

If, however, it is demonstrated that the Dominion Coal Company's present and future financial and operating conditions will be improved by the proposed exchange, the whole lengthy argument of the Dominion Company in opposition thereto becomes of no effect. The Dominion Company has not attempted to controvert in detail the assertions of the Nova Scotia Company that the proposed exchange will improve the position of the Dominion Company, and it is a matter of honest belief on the part of the Scotia Company that its proposals have not been fairly and accurately investigated, but have been assumed to be necessarily inimical to the Dominion Coal Company, because they would be of immediate benefit to the Scotia Company.

The position of the Mines Department of Nova Scotia in the exchange proposal is easily understood, because while an undoubted problem exists, as between the two Companies, a much greater problem presents itself to the Government of Nova Scotia, whose revenues are largely dependent upon the coal royalties and whose position as steward of the peoples' interest in the undersea coal field off Sydney Harbor, places upon the Government certain inescapable responsibilities.

The existing situation in regard to the undersea coal leases off Sydney Harbor was well described by Mr. C. A. Magrath, the Fuel Controller, sometime ago who stated that "a map showing the coal leases in that part of the Province of Nova Scotia looks more like a checker board than anything else. . . . I have seen sufficient to warrant me in saying that there should be a readjustment of the leased coal areas in the Sydney District."

Mr. Magrath, realized that the tangle of leased areas was a condition which had come about under the administration of provincial laws, and can only be remedied by like authority and stated:

"This, however, is outside of any function of mine, and my request to meet an immediate national necessity has been so resisted, and so much fear expressed that the Dominion Coal Company's bondholders may suffer, that I feel justified in going on record as to my views in respect to the interest of the public.

"Furthermore, I hold that the **readjustment of coal areas would be in the best interests of the Companies themselves.** It would mean that each Company would have its areas so adjusted as to enable it to get

its coal at the lowest possible figure, and certainly it would do away with the one Company paying tribute to another — which the consumer ultimately pays — in order to get to some distant coal areas."

In its application to the Commissioner of Mines, the Nova Scotia Company pointed out that the existing arrangement of the undersea leases, if it were not remedied, would result in heavy duplication of expenditure by the operating companies and waste of effort, which would diminish the general prosperity of the coal industry. Furthermore, it was shown, that any attempt to mine coal in comformity with the existing lease lines must heavily increase the cost of mining, and thereby increase the cost of coal to the public. It is also certain, that unless the existing lease arrangement is made more sensible and practical, the life of the submarine coalfield will be shortened, and the accessibility of the remoter undersea coal and its preservation for future mining will be seriously endangered.

The Dominion Coal Company has not attempted to deny these obvious consequences, because they are undeniable and must be the inevitable result of any attempt to work the undersea leases as at present arranged.

In its letter to the Commissioner of Mines, the Dominion Coal Company has stated that its undersea collieries are **designed and intended only to mine a two mile belt of coal seawards from shore,** which in effect is a statement that it is not concerned to preserve the accessibility of any coal lying seawards of the twa mile limit, access to which will be rendered most difficult if not entirely prevented by the upper workings of the present collieries.

The announced policy of the Dominion Coal Company—if carried out—will have a two-fold effect, namely, to shorten the life of the existing collieries and bring about their abandonment at an unnecessarily early date, and secondly, to render it extremely difficult for another operator ever to extract the coal lying below the abandoned collieries. How such a policy can be of benefit to the Dominion Coal Company is not explainable.

On the other hand, on the North Sydney side, the submarine coal which the Scotia Company is asking to be given permission to mine in exchange for its Waterford areas, is in a large measure approaching or exceeding two miles distance from shore. There is the very best reason to believe that some of the coal which the Scotia Company is seeking to acquire by exchange, can never at any time be worked by the Dominion Coal Company, whereas it could be worked at once by the Scotia Company.

Moreover, there are other areas on the North Sydney side which the Dominion Coal Company can work, but only at some indefinite future date. Yet these same areas could be worked by the Scotia Company immediately, and at a much lower getting cost than will ever be possible to teh Dominion Coal Company, because the Dominion Company can only win these areas by making expenditures duplicating those which have already been made by the Scotia Company.

The attitude of the Dominion Coal Company is hard to understand, because by leasing certain areas to the Scotia Company it would have been possible for the Dominion Company to enjoy a substantial annual revenue from extra royalties without the expenditure of one cent of capital, and this, be it remembered, from coal areas which have remained undeveloped in the possession of the Dominion Coal Company for over a quarter of a century, and will remain indefinitely undeveloped unless they are mined by the Scotia Company.

If the Dominion Coal Company seriously contends that its equities will be damaged by the exchange of coal areas which is proposed by the Scotia Company, it is an evidence that these proposals have not been studied or given fair consideration. The present arrangement of the undersea leases is so unpractical and unworkable that the necessity for its correction is admitted by all parties. The objection of the Dominion Coal Company to the Scotia proposals is made apparently because some immediate benefit will be thereby conferred upon the Scotia Company, and this is not denied, because the motive behind the Scotia Company's application is to obtain relief from an intolerable situation. At the same time, because the Scotia will be immediately benefitted, it does not necessarily follow that the Dominion Coal Company and the Government will not be benefitted, which indeed is the case. The existing arrangement of undersea leases is bad, and its effects must also be bad on all the parties concerned. Equally so the correction of the existing evils will benefit all the parties concerned, and it should not be regarded as a bar to correction of the situation by legislative action, that some immediate benefit will accrue to one of the parties. If corrective measures are not applied, a situation which is bad will become worse, and not capable of remedy, and then all the parties will suffer and will be unable to obtain relief.

It is because the Scotia Company is the pioneer of submarine coal mining that it is first to experience the evil consequences of the haphazard and thoroughly unpractical arrangement of the under leases.

The situation of the Scotia Company to-day will be the Dominion Company's situation to-morrow.

Railroad Builders on Strike.

The strike of workmen employed in the construction of a branch railway to the Copper Mountain Mines of the Canada Copper Company has lasted over three weeks and there is as yet no signs of a settlement. The latest developments are the outbreak of trouble in that town for which the strikers are said to be responsible, notably the occurrence of fires and the cutting of hose brought to quench the flames, and, if press dispatches are to be credited, the molestation of women. A Committee of Citizens has been organized to preserve order and the Provincial Government has arranged for the sending of a detachment of Canadian Mounted Police to the scene. The serious aspect of the matter from a mining standpoint is that it affects the biggest new enterprise in British Columbia, the possibility being the closing down of operations on a property which represents an investment of $2,500,000 as the continuance of work at Copper Mountain is contingent on the provision of railway transportation facilities. The W. P. Tierney Construction Company has the contract for the work. Last fall the men worked a ten hour day at a minimum of forty cents an hour. Towards winter it was decided to cut down to nine hours a day and when on April 1st the company announced that the ten-hour day would come into effect again the men balked. Now they insist on an eight hour day and a minimum of fifty cents per hour with no overtime or Sunday work.

Dominion Coal Company's Side of Coal Area Question

Public interest in the dispute between the Dominion Coal Company and the Nova Scotia Steel and Coal Company by a statement issued by the Dominion company regarding a further division of the submarine areas. In this statement there is a bill before the Nova Scotia Government for the purpose of obtaining sanction of the Legislature to the Order-in-Council permitting the Scotia company to break through the barriers of the Dominion Coal area on the north side of Sydney harbor. President Workman's objections to this bill are briefly:

"1.—That its titles were granted under such legislative sanctions and held under such legislative pledges that the legislature ought not now to alter them.

"2.—That the proposition of the Nova Scotia Company is so inequitable it ought not to be considered. It is that this company's inshore areas containing millions of tons of excellent metallurgical, easily won coal should be forcibly taken from it and that there should be given in exchange submarine areas that have not been proved and cannot be proved to contain coal.

"3.—That the Nova Scotia Company has ample reserves of coal and should develop these.

"4.—That this company's coal areas in North Sydney are vital to the maintenance of its industries, the magnitude of which are outlined.

"5.—That its security holders purchased its securities under such circumstances that no Legislature ought to change the property pledged without the consent of the holders."

The reasons given by the Nova Scotia Steel and Coal Co., for asking the Provincial Government to readjust the leases are taken up by Mr. Workman. The substance of these he sums up as follows:

"That it has reached the boundaries of the seams presently being worked in its leased areas and that to extend these workings to its outside areas would cost a large sum of money; that if it did extend these workings the cost of winning the coal would be prohibitive; that the present operations endanger the possibility of winning the coal from outside areas; that upless it can secure metallurgical coal at cheap cost it must close its blast furnaces, and that this will be accompanied by the decay of the towns that exist by reasons of its operations."

In this connection he remarks:

"It is true that it endeavors to state its own necessities in the form of general propositions, and without any justification in fact asserts that the Dominion Coal Company will soon have to restrict its operations at Glace Bay by reason of its workings coming to the boundaries of the outside areas of the Nova Scotia Company. The application is based upon the necessities of the Nova Scotia Coal Company and not upon any public interest involved. The unwarranted suggestions are made that royalties will be lost to the Province; and that the cost of coal to the public will be increased if the Nova Scotia Company's present workings are not utilized to extract coal from its neighbor's property."

Mr. Workman finds some discrepancies in the statements made by the Nova Scotia Steel and Coal Co. when it was issuing securities and those contained in the present application. These points are dealt with as follows:—

"It is difficult for this company to understand the merits of the Nova Scotia Company's application if based on its own necessities. When it sold its securities in London and to the public in 1913, its prospectus then issued by the authority of its responsible officers stated that it has 2,556,900,000 tons of coal at Sydney Harbor. So late as 1915 the Royal Securities Corporation of Montreal, in selling $1,000,000 of debenture stock, repeated this statement in its selling prospectus. The report of Mr. Eckel, a mining engineer, also placed the Scotia holding at 2,500,000,000 tons."

"In 1913 the Nova Scotia Company represented to this company that it desired to reach its submarine areas near Cranberry Head and a lease of all the coal in the Sydney main seam of two square miles was granted the Nova Scotia Company by this company to enable it to extend its Princess pit to reach its outside areas. The royalty charged was only 10 cents per ton and in the territory granted were 12,000,000 tons of excellent Metallurgical coal. Plans submitted with the application show the workings have not been effectively prosecuted in this large body of coal. The present possible output from these workings is said to be 1,200 tons a day. From the experience of this company it is believed that by the proper development of this mine its capacity could easily be increased to 2,000 tons per day. With all this coal available and capable of being worked it is difficult to understand the statement in the application that the Princess Colliery is "now faced with complete exhaustion."

The enquiry of the Fuel Controller, Mr. Magrath, is also quoted in the same connection.

After dealing with the necessity of the Dominion Company maintaining its reserves of metallurgical coal, so essential to the steel department as well as to the sale of the company's securities, Mr. Workman concludes:

"This company desires to emphasize not only the question of sanctity of titles, and the unfairness of the suggestion in the memorandum filed by the Nova Scotia Company where proved coal can be won at a low cost is to be taken and unproved territory given in exchange, but also the necessities to the existence of its undertakings of an ample reserve of metallurgical coal.

The Dominion Coal Company and its allied corporations have gone into the market eight times to secure money to acquire, build and prosecute its undertakings. It may have to go again; but what reception will its prospectus have if it becomes known to the financial world that its leases are to become the prey of anyone coveting its metallurgical coal?

"The company has taken a position from the beginning of this discussion that it is its duty to its shareholders and security holders to maintain its properties for the purposes for which they were acquired. It must also keep faith with the banking houses of

world wide reputation who bought its securities from the company and sold them to their clients. Common business honesty requires that this company maintains that position.

It is not the province of this board to do more than respectfully urge upon the Government the consequences that would follow interference with its titles granted after the discussion and sanctions already pointed out. Capital would shun investments in this province and the high reputation for integrity that the province enjoys would be tarnished. It is not in consonance with British institutions or the traditions of our race to nullify contracts by legislative action. So rigid are these principles fixed in the national character that it is given expression to on every occasion."—Financial Times.

Platinum Deposits in B. C.

Discussing the platinum deposits of British Columbia, which he investigated last year, Mr. Camsell says: "Considerable interest was shown in prospecting for placer as well as for lode platinum throughout the province as a result of the publicity given to the government's requirements, the establishment of a local market in the assay office, Vancouver, and the free assaying of platinum ores in that office. "For this reason he thinks that there should be a noticeable increase in the platinum production this year. The Tulameen District in the past, it is pointed out, has been the largest producer of platinum on this continent and to meet the urgent demands of the British Government this seemed to be the most likely field from which an extra supply could be secured.

Reference is made to investigations made in the Tulameen in company of Eugene Poitevin, who was making a study of the geological conditions under which platinum occurs in that district and comparing them with those in the Ural district of Russia, from which the greater part of the world's supply of platinum has been derived. He also visited the Nelson district and sampled deposits on Rover Creek, a Philadelphia chemist having ben said by the owners of one of the properties visited to have made an assay return of 2½ ounces of platinum to the ton and considerable gold. Mr. Camsell tells of the putting of two drills to work at the mouth of Slate Creek by the Government following the engineers' reports. He does not say what was achieved, but the work was not continued after the signing of the Armistice, although the indications up to that time were promising. At any rate, as Mr. Camsell says, there was considerable more activity in the district during the year and some forty ounces of platinum were produced.

After speaking of investigations on Potato Creek, at the head of Jervis Inlet, where platinum was said to exist, and on Shuttleworth Creek, which enters the Okanagan Valley at Okanagan Falls, where the geology suggests the possibility of the existence of platinum, Mr. Camsell states that it has been known for years that the mineral occurs in the gravels of the Fraser River in association with placer gold. Traces have been obtained in the course of dredging operations at Hope, B.C. About three quarters of an ounce was obtained by J. Russel, of Lilloet, B. C., by cleaning up the tables of an abandoned dredge, which some years ago was in operation a few miles below that point. Considerable platinum also occurs in the gravels of the Quesnel River, and its presence was demonstrated last year on Government Creek, which enters the Fraser River about forty miles below Fort George.

Adanac.

With regard to the reports recently printed in contemporaries pointing out negotiations for control of the Adanac mine by English interests, the report has been found to have no foundation in fact, according to official information just to hand.

In the meantime, good results are obtaining at the mine, a considerable quantity of high grade ore being encountered.

Mining Convention at Nelson in June.

Eastern British Columbia is to have an International Mining Convention during the month of June. The scene of the gathering will be Nelson, B.C. When the proposed Spokane, Wn., Convention was postponed some time ago mining men of the Provincial Interior determined that they would undertake the organization of such an assemblage. The enterprise of the B. C. Chamber of Mines in staging the recent International Convention at Vancouver, B.C., was not then foreseen, but it is not proposed that that shall interfere with the meeting at Nelson. Preparations are well in hand. Strong representation is promised from the State of Washington and particularly from the City of Spokane and there will be delegates in attendance from all the Eastern British Columbia Mining Districts. It is likely that the programme will provide for the discussion of many of the problems peculiar to that section of the Northwest.

Will Develop Coronado and Victory Mines.

There are good prospects that the Coronado and Victory Mines, Omineca, B. C., will be actively developed. These properties have been taken over by the Skeena Mining and Milling Company, which is incorporated for $250,000. The plant is being put in condition for operation. Water power is being taken from the Sloan and Halley Creeks and with this the plant will be able to develop 100 h.p. There is a concentrating mill similar to that of the Silver Standard Mine at New Hazelton and other equipment is to be installed which will permit the treatment of 100 tons of ore a day.

Mining Development in the Slocan.

Mining development in the Slocan and other Kootenay Districts of British Columbia is not lagging despite unfavorable market conditions. Andrew G. Larsen, a mining engineer interested in this section, explains that many properties, owing to the silver contents of their ore, are able to proceed with operations and store the lead if necessary. The Surprise, a silver mine at Sandon, B.C., is to be opened up and development is being vigorously pushed on the Noble Five because of its silver, the intention being to take the fullest advantage of the present market. A tunnel has been driven from which there is a raise to the ore bodies and the management is discussing the installation of a concentration mill. The mill also is to be started on the Cork-Province near Kaslo, B. C. The Florence Silver Mining Company has been operating its mill at capacity for several weeks and at less than capacity for months before. Silver bearing ore is being drawn from a number of its properties by the Canadian Consolidated Mining & Smelting Co. It is expected that the mill of the Silversmith Mines soon will resume operations, it being reported that development has resulted in the proving of a large body of good ore.

Mineral Areas of Alberni Canal

Dominion Geologist Makes a Preliminary Survey of Prospecting at West Coast Points.

Mr. Victor Dolmage, of the Canadian Geological Survey, to whom was assigned the work of a reconnaissance survey of the mineral areas of the northern portion of Vancouver Island during the season of 1918, after having gone over the district contiguous to Quatsino Sound, proceeded to cruise down the west coast of Vancouver Island, and for three weeks examined as many mineral localities as time and circumstances would permit. Owing to the lateness of the season, states Mr. Dolmage, and to the fact that local guides were not always available, many of the deposits, and in some cases the best, were not examined. Some prospecting was done during the trip, and such observations on the geology of the region made as would suffice to outline plans for future work.

The Indian Chief Group.

One of the properties visited by Mr. Dolmage was the Indian Chief, which is situated on Sidney Inlet, and which is one of the only two claims in this portion of the district which has reached the shipping stage—the other shipper being the Monitor, situated near the entrance to Alberni Canal.

The Indian Chief group, now owned and operated by the Tidewater Copper Company, has been worked at many times and by many different companies since 1897, and has produced a lot of high grade ore. At present it is equipped with a small oil-flotation concentrating-mill which is situated on the beach and connected with the mine by an aerial tram. The ore, which consists of bornite with small amounts of chalcopyrite and chalcocite, occurs in a garnetized limestone, capping a hill composed of granodiorite. The limestone, except at the very top of the mountain, is metamorphosed and signs of mineralization are plentiful. Some very rich bodies of bornite have been extracted from both the north and south sides of the hill, and some smaller ore shoots have been discovered in the main tunnel on the south side. The mill, which was completed only a little over a year ago, was operated for a few months only and at a considerable loss. This was partly due to the unsatisfactory nature of the machinery in the mill and partly due to an irregular supply of ore often of too low grade. The mill was shut down, and a shipment of picked ore was made direct to the smelter. At the time of the examination a small force of miners was carrying on development work in the main tunnel.

The Monitor Group.

The Monitor Group of claims is situated on the north shore of Alberni canal just at its entrance, the mineralized zone extending back from the shore several thousand feet. The property was discovered in 1898 and during 1900 and 1901 steadily produced ore which was shipped to the Tacoma smelter. From 1902 it remained virtually idle until 1916. The present owner, Mr. Leonard Frank, of Alberni, bought the property some years ago, at a tax sale. Since 1916 it has been leased to James Skeen of Seattle, who has done considerable work on the various showings that have been discovered since his taking charge, and has installed considerable expensive equipment. The ore consists of pyrrhotite and chalcopyrite with small amounts of magnetite and pyrite. It occurs chiefly in the altered limestone, which consists of calcite, quartz, garnet, epidote, and actinolite. Some of the ore is found in the metamorphosed volcanic rocks which are altered to epidote, chlorite and hematite. Like all the deposits of this type found on the west coast of Vancouver Island the ore is very irregular and the value of the mine, therefore, difficult to estimate. A considerable tonnage of shipping ore averaging 8 per cent copper has been proved and in the new showings there are large lenses of concentrating ore of medium low grade, but it is doubtful if sufficient ore has been proved to warrant the installation of a concentrating plant. At the time of the examination the mine was shut down on account of financial difficulties.

Black Sands.

A visit was also paid to the Wreck Bay Beach placers lying between Kennedy lake and the West coast of the Island, and extending from Ucluelet to Tofino inlet in a flat coastal plain composed of unconsolidated sands, fine gravels, and thin beds of blue clay. The plain is about 60 feet above sea-level, and is bounded along the coast by a perpendicular wave-cut cliff at the foot of which is a beautiful beach sloping gradually out to sea. These sediments contain a small amount of black sand and fine gold which is being continually concentrated at the base of the cliff by the action of the waves. Prospectors and campers came periodically and cleaned up the gold by panning the black sand found at the foot of the cliff. Several attempts have been made recently to use small concentrating machines operated by hand or by small gasoline engines, but the amount of sand is too small for continuous operations and is soon worked out. A number of years ago some of the local settlers organiezd a company and installed a flume, and sluice boxes, from which were obtained several thousand dollars worth of gold, this being the first time these wave-washed concentraters had been worked. The gold probably comes from the gold-bearing quartz veins that are known to exist in the mountains to the west of Kennedy Lake. The quantity of gold in the sediment is much too small to be extricated commercially by working them where concentration had not already been effected by wave action.

MINERAL DEPOSITS OF SOUTH AMERICA.

By Benjamin L. Miller and Joseph T. Singewald, published by McGraw-Hill Book Co., Inc., New York. Price $5.

This excellent compilation of information concerning minerals and mines of South America has been written by two American geologists who made an extended trip through South America in 1915. They have during the past few years contributed a number of articles to the Engineering and Mining Journal on their observations. In this book their personal observations have been supplemented by a bibliography of the available literature. Many competent authorities have assisted the authors, both during their visit to the various mining districts and subsequently. Those who are interested in any way in the ore deposits of South America will find this comprehensive treatise very useful.

Special Correspondence

NORTHERN ONTARIO.

Dome Mill in Operation.

The mill of the Dome mines has resumed operations after having been held in idleness for the past year and a half due to economic pressure caused by the war. The mill is now operating at a moderate rate, and will rapidly be brought up to a capacity of about 600 tons daily. Following the establishment of the required organization, the capacity will gradually be increased until a maximum tonnage of around 1,350 tons daily can be treated.

The policy of the management is to maintain a high degree of efficiency, toward which end a gradual building of forces will be necessary rather than the rapid accumulation of large forces.

Work Resumed at Barton-Munro Property.

Work has been resumed on a small scale on the property of the Burton-Munro property, situated in the township of Munro.

McKinley-Darragh.

The McKinley-Darragh mine is producing silver at the rate of about 1,100,000 ounces annually, according to figures based on the output for the first quarter of the current year. It is understood the output for the first quarter amounted to about 275,000 ounces, and that the value of production average about $92,000 monthly.

Dividend disbursements at the rate of 12 per cent. annually call for the distribution of some $67,428 every three months. In connection with this it is interesting to note that provided net profits amount to about 33 cents per ounce as was the case during 1918, the present net earnings amount to about $30,000 monthly, or about $22,000 quarterly above dividend requirements.

The oil flotation plant has just been set in operation, having a capacity re-treating some 250 tons daily of sands and slime from past operations.

Tough-Oakes.

The development of the Tough-Oakes Gold Mines has assumed proportions of leading importance. During the month of April, according to official advice, approximately 1,016 feet was driven in the underground workings. A total of 98 men were on the payroll at the end of the month and seven machines were employed. It is evident, therefore that an average of close to 150 feet daily was accomplished with each machine during April. While in some of the work the speed attained was slower than the average, there were instances where drifting was carried on at the rate of around nine feet daily.

During the month a new vein, containing $20 ore across the full width of the drift, was encountered and opened up for considerable distance. Development work on other veins also proved satisfactory and a considerable tonnage of ore is being either broken or blocked out ready for treatment just as soon as the management consider the time opportune to re-open the mill.

The company now has about $140,000 in its treasury after having retired all debts, and it will not be necessary to start milling prematurely in order to meet financial obligations.

Plant for Charette Property.

The installation of steam driven plant on the Charette property in the township of Boston has been completed, and will greatly expedite the exploration and development of this promising prospect.

Casey Mountain.

The Casey-Mountain Syndicate, operators of the property of the Casey Mountain Mining Company, Ltd., has let a contract for driving a 200-ft. cross-cut.

The property is situated about two miles northeast from the Casey-Cobalt mine, situated in the township of Casey. A shaft has been driven to a depth of 425 feet, during the course of which work, a layer of diabase about 320 feet thick was cut, followed by a layer of conglomerate about 110 feet thick, underlying which is keewatin formation. The geology, therefore, is considered favorable, and exploration will be directed in that zone immediately above the conglomerate-keewatin contact.

While sinking the shaft, commercial values were encountered in a fracture occuring in the diabase formation. At one point, it is stated, values average about thirty ounces of silver to the ton over a width of several feet.

Temiskaming.

Reports continue to the effect that the Temiskaming mine has developed an important orebody at the 500-ft. level. In spite of the absence of official confirmation, it is reported in usually well informed circles that the vein has an average width of upwards of four inches, and is composed of high grade ore, in fact the discovery being reported to be one of the richest ever made in the mine. It is stated that about sixty feet of drifting has already been done as well as about thirty-five feet of raising.

Mining Corporation.

The Mining Corporation of Canada will diamond drill on its property in the south-eastern part of the township of Bucke for the purpose of exploring the much discussed contact which may be traced for several miles, running in a north-westerly direction. A hole will be driven to cut the contact at a depth of about 300 feet.

Power for Miller Independence Mine.

A conference was held this week between Miller Independence interests and the Northern Ontario Light and Power Company, and an agreement reached whereby the power company will construct a transmission line to the property, from its main Kirkland Lake line. The necessary motors and equipment is being placed on order so as to eliminate any chances of delay in changing from steam to electric power, immediately following the completion of the transmission line.

This week machines are being put to work in the incline shaft where such rich gold telluride ore was opened up during the last half of 1918; also, a station is now being cut at the 200-ft. level of the new central shaft so as to make room for setting up a diamond drill machine preparatory to carrying out exploration work well in advance of actual development work.

Will Operate Huronia Mine.

The power line to the Huronia Mine, at Beaverhouse Lake, in the Larder Lake gold area, is being repaired, following which mine operations will be resumed. The old and obsolete mill is being torn down, and, should development work prove to be satisfactory, a new mill will be constructed at some later date.

Wisconsin-Skead.

A statement has just been issued by the Wisconsin-Skead Mines, in which assay results are enumerated, showing considerable commercial ore has been opened up on the company's property, situated in the township of Skead.

Diamond drilling carried on to a depth of nearly 600 feet indicated ore at that depth.

Encouraging Prospecting.

An article which appeared in the Canadian Mining Journal in its issue of April 30, dealing with the question of "Encouraging Prospecting," is being read with interest by mine operators in Northern Ontario. The article, which has evidently been prepared with a good deal of thought, has a ring of sincerity and contains a number of suggestions that should prove beneficial, if carried out. Six points are brought out, all of which appear to deserve careful consideration. The six points are these:—

"1. The levying of 2 per cent. tax on all profits in mining, such money to be expended by the company paying the tax in actual prospecting and under their sole suprvision and for their sole profit.

"2. Increase geological work by the Government.

"3. Government night schools for prospectors.

"4. Collection of minerals at all Government recording offices, night schools, and other localities were of advantage to the prospector.

"5. Five free assays with each miner's license.

"6. Government testing plant, where small lots of ore could be sold."

The foregoing forms the substance of the Journal's article.

To deal with these points separately, it should be pointed out that with regard to suggestion No. 1, that of all the mining companies which have won success in mining the amount of money spent annually in prospecting is even now very considerable. In some instances the annual outlay is greatly in excess of 2 per cent. The writer is of opinion that a direct tax for the purpose would only involve unnecessary red tape. Indeed as matters now stand the large army of independent prospectors in the field derive a good deal of support from the successful mining companies which are ever on the alert for new property. There would not appear to be any necessity of a direct tax for the purpose.

With regard to point No. 2 there appears to be room for adding to the extent of geological work, particularly in the northern districts. With regard to this, it is understood a very extensive programme has already been decided upon this year by the Government.

Concerning point No. 3, the suggestion that a system be provided for the purpose of giving the prospectors the benefit of a short course in geology and mineralogy appears to be one worthy of the united support of all mining men.

Points No. 5 and 6 could be dealt with jointly. With regard to these, it will be interesting to turn to the official announcement in this issue which conveys the information that the Ontario Government has taken over an ore sampling plant in Cobalt. This plant, it will be noted, is equipped for sampling shipments of ore either in small lots or in carload lots. Thus, the shipper, no matter how small or large, learns the value and content of his ore and, in the case of silver ore, can dispose of it to local mining companies who are in the market for ore, or, in the case of other mineral can find a market at whatever point equipment suitable to treat it is in operation.

With regard to the ore sampling plant it has not yet been learned whether or not an assay business will be conducted in connection with the plant. It would appear to be probable, however, that such will be the case. The suggestion might not be remiss that the Government should take this phase of the question into consideration and conduct an assay business for the benefit of prospectors, the latter to be charged only the actual cost of making the assay.

Government Takes Over Sampling Plant.

At the request of mining men of this district the Ontario Government has decided to provide the mines of Northern Ontario with ore sampling facilities, toward which end an arrangement having been concluded with the Temiskaming and Northern Ontario Railway Commission to take over the plant of Campbell & Deyell, at Cobalt, and at once put it under the supervision of Arthur A Cole, Mining Engineer for the railway.

Early in the current year mining concerns grew alarmed over the announced intention of the firm of Campbell and Deyell to close its sampling plant. An appeal was addressed to the Dominion Government through Hon. Frank Cochrane, M.P. for this district. The appeal was ignored. The facts of the case were then placed before the Ontario Bureau of Mines, and the great inconvenience that would devolve upon the mines as well as prospectors were shown and were quickly recognized by Hon. G. Howard Ferguson, Minister of Lands, Forests and Mines. Negotiations were entered into almost immediately, with the result as stated above.

Mining men in general appear to recognize the fact that this movement on the part of the Ontario Government is somewhat of a departure from the usual procedure, and was only taken after becoming firmly convinced of the great importance of such a plant to the mining camp. The step is looked upon as another demonstration of an earnest desire to lend the utmost encouragement and assistance to the mining men of this province.

At first it had been supposed that any one of several leading mines of Cobalt could easily afford to purchase and operate the ore sampling plant, but this belief was not well founded because of the fact that these mines are in the market to buy ore from other mines, and naturally desire independent interests to appraise the value of any such purchases of ore. It should be pointed out that an ore sampling plant such as that of Campbell and Deyell's just taken over by the Government, serves as medium by which the vendor of ore can determine the content of that which he desires to sell, and the purchaser learns the value of that which he desires to buy. In shipping ore to southern smelters it is found possible to appraise the value of the shipment here, the smelter accepting the figures given. This makes it unnecessary to either

send representatives to the smelters to keep tab on the ore in process or take pot luck on the returns.

Therefore, in taking over the plant and assuring its continued operation, the Ontario Government has taken a step that will probably meet with universal approval, not only in the mining camps in this part of Northern Ontario, but in all mining camps where the value of such assistance to the mining industry is fully understood.

Minister of Mines Visits Northern Ontario.

Hon. G. Howard Ferguson spent several days touring the northern district in connection with the huge construction program which has been decided upon by the government. The Minister of Lands, Forests and Mines came north on May 6th, returning south May 11th. During the course of his tour, he visited Elk Lake in connection with the Elk Lake Gowganda waggon road, later calling at Boston Creek, thence at Kirkland Lake in connection with the plan to construct a first class motor road for the benefit of the mines. It has been officially stated that the railway project to the camp will be held, pending further development. The decision to build a motor road is in compliance to the wishes of the leading mine operators of the camp, the government having previously announced its intention to build a railroad. The Minister also visited Timmins in connection with the extension of the railway from Timmins to Temagami Heights, later continuing on to Kapuskasing.

Hollinger Force is Growing.

The Hollinger Consolidated has upwards of 1,300 men employed, and intends taking on an additional 450 just as soon as that number can be conveniently absorbed, it has just been learned. Efficiency is gradually increasing and the mine is gradually increasing its volume of output.

With a force of perhaps 1,750 men on the pay-roll before the end of the summer, it can at once be reckoned the very extensive community that is rising round about the mine. In addition are a number of other important mines. As a consequence, the town of Timmins is growing rapidly in population and the building program is totally inadequate to meet the situation.

United Porcupine.

The United Porcupine Mine, scituated a short distance south from Golden City, in the township of Whitney, has been sold, it is reported. The property was worked a good deal prior to the fire of 1911 which destroyed the mining plant. Since that date, not much work has been done. New York interests are said to have purchased the property.

Fidelity.

On the Fidelity property, which adjoins the La Belle-Kirkland Mines on the west, sinking operations have been carried to a depth of about 100 feet. The vein, which showed a width of but two feet at a depth of 40 feet, has widened out, and at the present point of operation is said to be about eight feet in width.

Although sampling has not been systematically carried out, the heavy mineralization of the vein is encouraging.

La Belle Kirkland.

The Goodfish Lake section of the Kirkland Lake district is coming in for increasing attention. Encouraging developments on the property of the Fidelity Mining Company, together with the fact that a plan is under way, which, if successful, the La Belle-Kirkland Mines will be again operated on an extensive scale, is serving to rejuvenate activity among the property owners in that vicinity.

Although reports that the La Belle-Kirkland will resume operations immediately are somewhat premature, yet the development is considered a probability within a reasonably short time. The plans now being carried out by the La Belle is to sell 500,000 shares or less, of its treasury stock. On April 1st, of this year, the stock in the treasury amounted to 779,292 shares. This plan, if successful, would enable the company to at once proceed with development work, and in due course should add another producing mine to the Kirkland Lake list.

According to official information the main shaft has been carried to a depth of 360 feet. Drifts and crosscuts aggregate 1,150 feet. During the course of previous work some five veins have been opened up. In the main workings on No. 1 vein exposures of ore range from four to ten feet in width and contain average values of about $10 to the ton. Above the 275-ft. level, according to official estimates, some 40,000 to 50,000 tons of ore is in sight.

Up to the present the company has spent about $170,000 on the property, the operation having been conducted in a conservative manner under the management of Frank C. Loring. Diamond drilling performed about two years ago indicated the presence of ore to a depth of 700 feet.

The Tough-Oakes Merger.

Although official information on the subject is lacking, it is reported in regard to the proposed merger of the Tough-Oakes Gold Mines, with the Burnside and the sylvanite properties and the Aladdin-Cobalt Company, that the basis of exchange, as proposed, would work out at about $1.05 per share for the Tough-Oakes, it being intimated that the basis of exchange would be Tough-Oakes, one pound; Burnside, one pound; Sylvanite 10 shillings; and Aladdin 13 shillings.

Bourke's Gold Mines.

The Bourke's Gold Mines, operators of property at Bourke's Siding a short distance north-west from the Kirkland Lake field, has begun collecting data and making preliminary arrangements with a view toward proceeding with the installation of a small mill during the coming fall provided development work continues favorable.

As yet, the vein has been found to be comparatively narrow, the most extensive ore shoot being at the 100-ft. level, where the deposit shows a commercial gold content over a width of about twenty-eight inches and about 160 feet in length. The workings have since been carried to a depth of 200 feet, but sufficient lateral work has not been carried out to determine the extent of the ore shoot at that depth.

At the present time, the capacity of the mining plant is being increased with a view to carrying development to a depth of 500 feet. With this work completed, and followed by a reasonable amount of lateral work, the plans for the construction of a small mill will perhaps take concrete form.

Porcupine Crown.

Mr. Harry Darling, manager of the Porcupine-Crown Mines, is expected to arrive in camp about the middle of May, following which the mill will be tuned up preparatory to resuming production. Satisfactory progress is being made in operations made necessary by the cave in of the mine earlier in the year.

It is proposed to also carry operations to a depth of about 1,400 feet, as well as conduct further exploration work by diamond drilling.

Porcupine V. N. T.

Friction between the American and English interests involved in the Porcupine V.N.T. appears to have developed. Officials, while not denying the reports, are reticent. It is reported in usually well informed circles in the north that there appears to be some possibility of the withdrawal of either one of the factions. Reports have it that the English interests might, or perhaps have already done so, make a bid with a view to purchasing the interests of the American holders. The property has long since been looked upon as one of large merit. Lack of harmony has been a factor in retarding work on previous occasions as well as the present. The financial standing of the company is difficult to ascertain, but an official informed your representative that close to three-quarters of a million shares still remains in the treasury.

BRITISH COLUMBIA.

Fire at Princeton.

Railway construction men on strike at Princeton, B. C., became troublesome towards the end of April and are charged with responsibility for a fire which broke out at the Princeton Coal and Land Company's plant. That the outbreak was incendiary in its origin is supported by the fact that the hose, with which an effort was made to control the flames, was found to have been cut. While no definite particulars have been secured as yet it is not believed that serious damage resulted. Detachments of the Royal Northwest Mounted Police have been dispatched to the scene and it is confidently expected that order will be restored in a short time.

Merritt Collieries.

Satisfactory progress is being made in the opening of the new No. 3 Mine of the Merritt Collieries, Ltd. Two slopes have been driven as well as two levels. Thos. Rowbottom is in charge of the work.

Work Resumed at Wakesiah Mine.

The Canadian Western Fuel Company are continuing the development of the Wakesiah Mine. This work was pressed forward for some months and then stopped. Its resumption is taken to indicate the company's intention to put the mine on a producing basis as soon as possible.

Pumping Out Coal Mines at Suquash.

The Pacific Coast Coal Mines, Ltd., have pumped the water out of its old mine at Suquash, Vancouver Island. This property has been idle since the year 1914. With a ready market and good prices it is likely that the company proposes making it productive without delay. This mine is situated in what is known as the Suquash Coal Field of the Island, approximately 170 miles north of Nanaimo, B.C. Comparatively little active development has taken place in that section.

Activity at Kaslo.

Reports indicate mining activity in the district traversed by the south fork of the Kaslo Creek. With development being carried on at the Gibson Mine, and the Index, and with the Silver Bell added to the list of shippers; with the continuance of operations at the Cork-Province, which was closed down for a short time during the winter on account of the shortage of wash water for concentrates, the outlook is good. The increased attention being received by the properties of this section is their generally high values in silver.

Ore Testing Laboratories.

Hon. Martin Burrell, Minister of Mines in the Dominion Government, deals with the proposed establishment in British Columbia of one or more ore testing mills in a letter to F. A. Starkey, of the Associated Boards of Trade of Eastern British Columbia. He says: "Such a plant would be a branch of our ore-testing laboratories in Ottawa and would deal as far as possible with the various problems connected with the treatment of all minerals in order to stimulate prospecting and the development of those extensive mineral regions which have had little development work done on them, as well as the taking up the question of the treatment of various kinds of ores, the value of which it might be difficult to ascertain by those who could not afford to ship so far as it involved in sending to Ottawa. In any case it will necessarily take some time before we can get anything actually constructed and we hope to make an examination of some of the later ore-testing laboratories in the United States and shall give the fullest consideration to the situation in British Columbia, including that of the Kootenays, before decision will be reached."

Ground Caves at Phoenix.

An immense cave-in has occurred in the workings of the Granby Mine at Phoenix, B. C. No serious damage, however, is reported as such an occurrence was not altogether unexpected. The Great Northern and Canadian Pacific Railway companies' rails are not being used in the vicinity of the break so that a temporary interference with transportation has resulted. Residents are moving from the affected area.

Drilling for Oil in East Kootenay.

Drilling for oil in the Flathead District of East Kootenay is to be continued by the B. C. Oil & Coal Development Co., Ltd., headquarters Union Bank Bldg., Victoria. Four test wells had been put down before the war brought out and some oil had been taken from two of them. Arrangements were being made for the sinking to a greater depth when the outbreak of hostilities made it impossible to complete the financial arrangements. It now is hoped to complete the work and the company's directors appear to be confident of success.

Gold Strike Near Fairbanks.

Information has been received at Prince Rupert of a gold strike in Alaska, not far from Fairbanks, the scene of the find being more exactly described as on the Stuyhok River, a tributary of the Bonisilla, good prospects having been found on Henderson, Last Chance and Flat Creeks. One hole put to bedrock on bench ground netted forty cents to the pan from a general average of ten pans. At the time word was dispatched there were about 100 men on the ground and grub was reported to be scarce.

Reduction in Ore Treatment Rates.

The management of the Consolidated Mining & Smelting Company has issued a circular under date of April 23rd, 1919, announcing a reduction of ore treatment rates at the Trail Smelter. It reads as follows:

To Lead Ore Shipperss

Schedule B. lead ore rates provides for adjustment of the base rate up or down on the increase or decrease in the prices of coke or labor as follows:

On the price of coke 25 per cent of the increase or decrease per ton.

On the price of labor per shift 1½ per ton for each 1c charge per shift.

The last adjustment was an increase effective August 1, 1918, as outlined in our circular of August 27th, 1918, which amounted to 80c per ton.

The price of coke has advanced since then 40c per ton, which indicates an increase of 10c per ton of ore.

The price of labor has decreased since then .3646 per shift, which indicates a decrease of .55c per ton of ore.

The prevailing base rate of $8.30 per ton will be reduced, effective April 15th, 1919, 45c per ton, or from $8.30 to $7.85 per ton of ore.

Since the beginning of the year fifty-four mines have shipped ore to the Trail smelter. The total number of tons of ore shipped for the period is 117,964. During the week ending April 21st last a total of 7,420 tons was shipped to the plant. Following are the shipments for the year to date:

Districts.	Totals in Tons.
Boundary	22,832
East Kootenay	111,120
Nelson and Salmo	446
Rossland	38,825
Slocan and Ainsworth	3,066
American Mines	186
Miscellaneous	113

Atlin District Should Have a Canadian Seaport.

Archbishop Du Vernet, of British Columbia, has published an interesting suggestion for the consideration of the Canadian authorities, the object of which is the opening up of the northern mining districts of this Province to larger and more rapid development by making feasible the provision of better transportation facilities than now are available. His proposal is best explained in his own words, as follows:

"Now that the Peace Conference has introduced us to the very sensible idea of a corridor to allow a shut-in nation access to the sea we should press the Canadian Government to secure a corridor up Taku Inlet in Alaska to allow the Atlin District to have a Canadian sea-port. A narrow strip of territory about twenty-five miles long would be quite sufficient, and as there are no settlers there at present there would be no complications, as there would be at Skagway. The shortest and easiest way into the rich mineral region of northern British Columbia (once a road were made) is up the Taku River. The Taku and Nakina rivers form almost a direct line to Teslin Lake at the north end of which is the placer gold field lately discovered. It is well-known that almost every creek in the Atlin District carries, gold, but inadequate means of transportation retards the development of the country. The Government of the United States is now in a most friendly mood towards Canada, and a greater output of gold is demanded."

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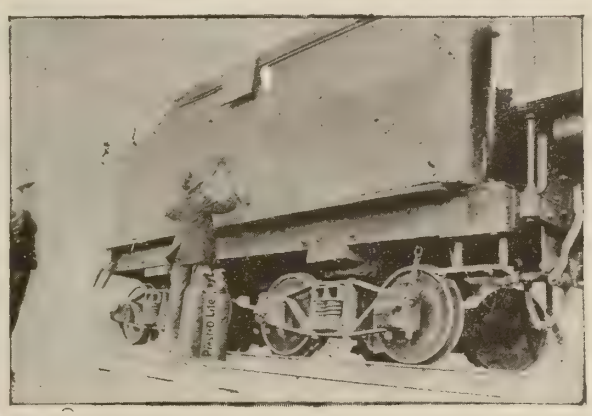

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THIS illustration shows an operator repairing a leaky tank car right on the track, at a trifling expense by the Prest-O-Lite Process of Oxy-Acetylene Welding. Thousands of Railroads, Mines, Factories and Machine Shops have adopted this process, and are saving hundreds of thousands of dollars annually.

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Prest-O-Lite PROCESS

employs both bases (acetylene and oxygen) in portable cylinders. Prest-O-Lite Service, which insures prompt exchange of full cylinders for empty ones. Provides dry, purified gas, insuring better welds, quicker work and lower operating cost.

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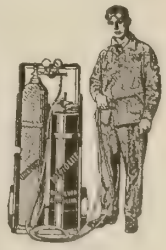

World's Largest Makers of Dissolved Acetylene

MARKETS.

Standard Mining Exchange

The following are the closing prices on the Standard Mining Exchange, Toronto, May 17th:

	Asked.	Bid.
Gold:		
Apex	4½	4
Baldwin	37	35
Boston Creek	28	25
Davidson	69	68
Dome Extension	33	32¾
Dome Lake	23	..
Dome Mines	..	15.00
Eldorado	1¾	¾
Gold Reef	5½	5⅛
Hollinger Con.	7.24	7.20
Inspiration	12	..
Keora	21¼	21
Kirkland Lake	49	..
Lake Shore	116	..
McIntyre	187	185
Moneta	12½	10½
Newray Mines	18½	18
Porcupine V. & N. T.	24	23
Porcupine Crown	33	32
Porcupine Gold	1½	1¼
Porcupine Imperial	1¾	1½
Porcupine Tisdale	3	2⅞
Preston	4½	4¼
Schumacher Gold M.	33½	33
Teck-Hughes	21½	21
Thompson-Krist	8¾	8½
West Dome Con.	15	14½
Wasapika	62	60
Silver—		
Adanac	22¼	22
Bailey	4¾	4¼
Beaver	46	..
Chambers-Ferland	14½	13⅛
Coniagas	3.00	2.75
Crown Reserve	44	..
Foster	5	4
Gifford	3¼	3⅛
Great Northern	5	4
Hargraves	4¼	..
Kerr Lake	6.20	5.80
La Rose	50	45
McKinley-Darragh	60	60½
Mining Corp.	..	175
Nipissing	12.50	..
Ophir	8¾	8½
Peterson Lake	9⅞	9⅜
Right-of-Way	4½	4
Silver Leaf	4	3½
Seneca-Superior	2	..
Timiskaming	44½	43½
Trethewey	43	41
Wettlaufer	..	5½
York, Ont.	2	..

VANCOUVER STOCKS.

(Closing prices, May 12.)

Mining—	Bid.	Asked.
Bowena Copper	..	.30
Cork Province	.01⅞	.02⅛
Drum Lummon	.20	.26
Granby	65.00	..
Howe Sound	3.25	..
International Coal	.24	.28
Lucky Jim	.02⅛	.02½
Nugget	..	.28
Rambler-Cariboo	.05	..
Rocher de Boule	.12	..
Standard Silver Lead	.23	.30
Surf Inlet Golf	.42	.44½
Utica	.05	..
Sunloch Mines	..	.35
Silversmith	.13	.17
Hazelton Gold-Cobalt	.03½	.04¼
Oil—		
Athabasca Oil	.46	.60
Alberta Pet. Con.	.01¼	.01¾
Beaver Oil	..	.00⅝
Canada Oil & Ven.	.00¼	.00½
Pitt Meadows	.15	.20
Record Oil	—	.07
Southern Alberta	3.00	..
Trojan Oil	.07⅜	.07⅞
Spartan Oil	..	.19

Dynamite Explosion at Issaquah Mine.

A ton of dynamite in the powder house of the Pacific Coast Coal Company's Issaquah coal mine exploded on Saturday night, April 5th. The town of Issaquah Wn. was rocked, several mine buildings being wrecked and a number of other houses damaged. The loss is estimated as between $5,000 and $10,000. No one was injured. John Kerr, night watchman, explains that he was making his rounds and was due to register at 10 o'clock. He was nearing the powder house when he noticed smoke, and stepping closer he recognized the spitting flame of a fuse. Kerr turned and ran towards the office, reaching it just as the powder house went up. Besides shattering windows in seventy-five to one hundred houses in the immediate vicinity, the side of the compressor house was blown in. It is not thought, however, that the compressor or other machinery was damaged. The timbers at the mouth of the mine were blown down. It is suggested by the evidence that the explosion was deliberately planned and in this connection it is recalled that the Issaquah Coal Mining Company, as it formerly was known, was controlled by Alvo von Alvensleben, a German interned at Fort Douglas Utah, and who is said to have been backed by the personal capital of his Emperor. Alvo von Alvensleben, it may be stated perenthetically, has coal mining interests in British Columbia, the most notable being what is commonly known as the Jingle Pot Mine, Vancouver Island, which still is a producer.

Belmont Surf Inlet.

A report covering the operations of the Surf Inlet Mine by the Belmont Surf Inlet Company up to the end of 1918 has been received. The net earnings of the company amounted to $323,242. A loan was made to the company by the Tonapah Belmont Developing Company, amounting to $1,295,726, and interest has been paid. The average metal contents of 83,142 dry tons of ore milled was 0.481 oz. in gold; O.3114 oz. in silver, and 0.2606 per cent copper per ton, giving a total value of $924,847, or $11.09 per ton. The ratio of concentration is 11.09 to 1, making 7,498 dry tons of concentrates having a gross value of $854,537. Operating costs were seriously affected by advanced prices paid for supplies and by abnormally high labor costs. The sum of $45,569 was spent in the construction of a store, schoolhouse, and houses for employees. The dividends of 5 per cent was paid on April 15.

EDITORIAL

WEST SHINING TREE GOLD AREA.

During the past six months a great deal of publicity, much of it of an undesirable character, has been given the West Shining Tree gold area. As we attracted some attention to this area by an article in the Journal after visiting some of the properties last summer, we feel a certain responsibility for developments. While we do not approve of many of the things that are being said about West Shining Tree properties, it is still our opinion that the area is a promising one and worthy of more attention from mining men. We do not recommend it to those who are looking only for sure things, and we are not surprised that some who have looked for mines have been disappointed to find only prospects. There are great chances to be taken by those who would develop gold properties in this area. We do not regard this, however, as a sufficient reason for condemning the area. We are rather inclined to the opinon that there is a great deal of risk involved in developing mineral deposits anywhere.

A recent contribution in the Toronto Globe from a Cobalt correspondent contains much with which we agree. He points out some regrettable features of recent promotions and sounds a note of warning. He says, writing from Cobalt on May 22:

"Mining interests in this part of Northern Ontario are showing considerable interest in the advertising literature being circulated in connection with a number of mining prospects in the West Shining Tree district. It is a well known fact that narrow quartz veins were found seven or eight years ago in that district, but that the deposition of gold proved decidedly patchy, and successful mining companies dropped options which they had acquired and withdrew from the field. The attitude of companies with broad experience has been that while there might be possibilities, after extensive exploration work, or meeting with some measure of success, yet the gamble would be too great. Now comes the advertising campaign on a number of properties in that district, the campaign being conducted by a number of Toronto brokers.

"Summed up, the situation is this: The West Shining Tree district appears to be entirely speculative; behind each of the alleged leading properties are men who appear to be devoting more time to promotion literature than toward mining; the prospective purchaser of mining shares is confronted with the simple task of either placing his 'bets' on the promotions of professional brokers, or looking over the mining fields of the North more carefully, and making a speculative investment in concerns which in some instances are equipped with mining plants, and in some instances with milling plants and backed by large tonnage of "proven ore," and promoted with development work in view as a first consideration.

"There is one other phase to the situation. In the West Shining Tree district there are a number of prospectors who have toiled hard in their effort to succeed in acquiring a reward for their labors. The discoveries made have been ample to encourage these men to stick to their claims. This being so, it follows that there must also be a gambler's chance for those who would purchase shares in companies operating in the field. Further, in taking a gambler's chance, the odds are heavy, and the utmost caution is advisable.

"The greatest danger lies in the promotions being made on a basis of a large block of promotion stock being held in the hands of the promoters, and a more or less small number of shares being left in the treasury, and while the treasury shares are being sold at a stated price the promoter may also be disposing of his stock at a similar price and thus secure a great deal more cash than the amount going to the treasury of the company. Not only this, but in selling the treasury stock there may also be a rake-off in the form of a large commission to those who sell the shares."

This is a warning that should be heeded. It applies not only to West Shining Tree gold mining companies. In fact, it is not even peculiar to mining companies.

On the other hand we would call attenton to the folly of pretending that there are safe and sure ways of making profitable mines out of prospects. The risks have been great and will be so in new fields. There is very little ground for comparison between the hazard of investment in a developed, producing mine and a prospect. Those who are too timid to spend money on prospects can very well be encouraged to invest in developed mines. But the bold adventurer who seeks new fields cannot and should not be persuaded to desist because the risks are great. He should have access to the known facts, however, and be made to realize that chances of success are small. Our disapproval of the statements of many promoters arises largely from their failure to advise buyers of shares concerning the hazardous nature of the enterprise. Some promoters are undoubtedly dishonest and are endeavoring to deceive the public. They sell under false pretences and are properly classed as criminals under the code. From them we can expect nothing good. We can reasonably hope, however, that the better class of promoters will endeavor to give their clients a fair deal. To do so they must be more careful in their statements.

RE-ORGANIZING BRITISH COLUMBIA BRANCH OF MINING INSTITUTE.

The British Columbia branch of the Canadian Mining Institute is being re-organized by Mr. Mortimer-Lamb, secretary-treasurer of the Institute, who is making a tour of the Province at the present time. It is proposed dividing the existing single provincial organization into four distinct branches, representative of the following sections: Vancouver Island and district; Victoria and district; Nelson and district; Prince Rupert and district. Each will be charged with responsibility in connection with the promotion of the best interests of the mining industry within the limits of its territory. A revival of interest in the Canadian Mining

Institute's work is expected as a result of this arrangement, an outcome much to be desired, as the influence of this important organization, although it has been splendidly maintained in other parts of Canada, has languished in this province. Mr. Lamb states that attention also is being given the matter of the annual Institute meetings, which hitherto have taken place in Eastern Canada, As it has been difficult for many western members to make the transcontinental trip for a meeting of two or three days, it is proposed that there shall be an annual meeting in the west. This, it is hoped, will obviate the inconvenience of the existing condition and lead to closer co-operation, and a more healthy fraternal feeling than has been evidenced. Mr. Lamb, who has travelled across the continent recently, and has paid special attention to mining activity, says that "in every mining centre in Canada there is a revival of interest, and everything points to this great asset of the country being developed to an extent where it will be the greatest medium in paying off the war debt of Canada. Prospectors are returning to the hills, machinery is going to abandoned claims, which are known to be still rich, and capital is being advanced from many sources to help bring out the hidden wealth of the different provinces."

THE GOLD MINING INDUSTRY.

While operations are growing daily in the Porcupine district, the manner in which the Kirkland Lake field is developing, and the increasing activty in the Boston Creek district is a guarantee that the premier gold camp of the Dominion will not monopolize attention. The industrial unrest in other parts of the country is not being lost sight of, but the gold mines which are just emerging from the great economic strain caused by the war do not appear to offer an attractive field for labor to make demands which the mines could not bear. The number of mine workers is increasing steadily, and by late summer the gold mining industry in Northern Ontario promises to assume proportions greater than ever before in the country's history.

THE SILVER MINING INDUSTRY.

Beyond a few minor complaints, the Industrial Relations Committee which visited Cobalt recently appeared to be presented with no evidence that should cause alarm over the situation in that district. The high price for silver is resulting in a high average wage to the mine workers of Cobalt, on the present profit-sharing system. It is true that considerable controversy centres upon the fact that the mine operators do not recognize the union. However, in view of the expressed willingness of the operators to deal with committees representative of their own employees the danger of any serious development in industrial relations appears to be minimized. During April it is considered probable that the quotations for silver will average perhaps $1.05 or perhaps $1.06 per ounce, with some promise of it rising to an average of perhaps upwards of $1.10 an ounce during June.

GOLD TELLURIDES IN NORTHERN ONTARIO.

By A. G. BURROWS.

The Ontario Bureau of Mines has added to its equipment at the Provincial Assay Office a grinding and polishing machine and microscope for examining metallic minerals by reflected light. By means of this equipment, aided by qualitative and quantitative analyses, we have been able to recognize some minerals in ore from the Tough-Oakes mines not hitherto known to occur there or, in fact, in Canada.

Some time ago rich specimens of gold ore from the Tough-Oakes mine were obtained from Mr. C. A. O'Connell. These showed native gold, calaverite, altaite, and some black metallic minerals. These latter minerals were determined to be a telluride of gold, silver and mercury, and a telluride of mercury, homogeneous minerals under the microscope. The former telluride was analyzed by W. K. McNeill and found to contain 20.40 per cent au., 31.1 per cent ag. and 10.2 per cent hg., which corresponds closely to the formula for kalgoorlite, a precious telluride, first recognized in gold ore at Kalgoorlie in West Australia. The mercury telluride gave strong reactions for mercury and tellurium, but contains no gold or silver, and is the mineral "coloradoite." The presence of this group of tellurides associated with gold is of scientific interest in its relation to the genesis of the ore deposit, temperature and pressure of formation of deposit, etc.

While the precious tellurides are probably rare in Kirkland lake ore, there is always the possibility of obtaining them in rich bunches in the veins. The precious tellurides in the material examined are in appreciable quantities. Tellurides of gold, without preliminary roasting, would pass into the tailing in the ordinary cyanide treatment.

Tellurides occur over considerable area along the line of the T. & N. O. railway, there having been recognized, in addition to those mentioned above—tetradymite (bismuth telluride) in Beatty township, calaverite and tetradymite at Boston Creek, petzite in Maisonville and Benoit townships, and hessite in Deloro township.

DIVIDENDS FROM B. C. MINES.

British Columbia mines have distributed nearly a million dollars in dividends for the first quarter of 1919, as follows:

	Rate for Quarter.	Amount.
Granby Cons. M. S. & P. Co.	2½	$375,010.50
Consolidated M. & S. Co.	2½	261,936.00
Belmont Surf Inlet	5	125,000.00
Howe Sound Co. (Britannia)	5	99,207.00
Florence Silver Mining Co. ..	3	34,746.00
Surf Inlet Gold Mining Co...	2½	24,689.90
Hedley Gold Mining Co.	2	24,000.00
Rambler-Cariboo	1	17,500.00
Total		$962,089.40

PERSONALS.

Mr. J. P. Hubbell, of the American Cyanamid Company is in this district, having visited Cobalt early in the week, and spending the latter half of the week in the Porcupine district.

Mr. Frank L. Culver, president of the Beaver Consolidated has returned to Toronto after having spent a few days at the company's Kirkland Lake gold mines.

Mr. G. W. Dixon, of the Buffalo Mines, is making satisfactory recovery from his recent illness.

Mr. Neill, of the Cassel Cyanide Company, Glasgow, Scotland, is expected to arrive in Cobalt to-day, accompanied by W. E. Simpson.

Mr. L. N. Goodwin, of New York, was in Toronto last week, and is now at West Shiring Tree.

Renewed Activity in British Columbia Silver Areas

The strong demand for silver, and the bright prospects as to prices, are having their effect in British Columbia. In the Kootenays, the Boundary and the Portland Canal Districts properties carrying silver values are receiving attention. Prospectors are going to the hills in larger numbers than for many years. In the Eastern mining sections of the Province preparations are being made in not a few instances to re-open silver bearing properties which have been inactive. Arrangements are being made to continue work on others still in the development stage, and practically all producing mines of this character are expected to be worked to capacity this summer. In the Portland Canal mineral zone the outlook is particularly promising. The next few months are likely to see a revival in this part of Northern British Columbia, in respect of mining that will remind old timers of the old days when the town of Stewart was a flourishing mining camp, being the centre and distributing point of a district of many active mines, and with a bright future. There are those who assert that Stewart is destined to come into her own again, that this time a permanent community with an assured future will be developed, and some foundation is given this belief by the number of engineers who are going into the country, by the glowing reports being spread of certain Salmon River properties and last, and perhaps not the least, by the fact that Stewart again has a newspaper, the first issue of the "Cassiar News," "issued in the interests of Salmon River, Portland Canal, Alice Arm and Anyox Mining Districts," having come from the press a few days ago.

One of the concrete evidences of the increasing interest in silver mining properties is the announcement of the sale of the Reco Mine at Sandon, B.C., to the James Dunsmuir interests, the sum involved being reported to be $250,000. This property is located on Payne Mountain, adjoining the Noble Five Group, which is owned by Mr. Dunsmuir and associates. With the Reno Mine, which has been operated for years and has made good returns, goes a number of contiguous claims which are, for the most part, undeveloped. The new owners, therefore, now have possession of a large area which, it is understood, will be extensively developed without loss of time.

F. A. Starkey, of the Eastern British Columbia Mining Association, discussing the foregoing and other indications of interest in the silver minerals of the provincial interior, says:

"It is also known that Clarence Cunningham has taken over the Elkhorn property, which ore will be treated at his mill, newly erected at Alamo. There is estimated to be a large tonnage of milling ore at the Elkhorn, which will be of great assistance in supplying the large tonnage necessary to keep the Cunningham mill running steadily.

"Outside of these actual sales of properties we have to record the preparations for a more vigorously conducted policy of development of several properties, all of which are located in the Slocan District. The Franz Brothers, Wallace, Idaho, have just arrived to instal a full equipment of machinery for the development of their property on Ten-Mile Creek, Slocan Lake. This property is situated some five miles above the Enterprise mine, and is known as the Richmond Group, which is a dry silver property, the ore of which in its returns runs into big figures.

"James Melley, Spokane, who with his brother, Edward, owns the Blackburn Group, situated at the head of Ten Mile and the South Fork of Kaslo Creek, has left for the Slocan with the intention of opening their property, which they have owned for some 18 years. Their mine is but partially developed, but they believe it is most promising. They see the wisdom of further work in view of the present demand for silver, and hope that the property shortly will be a producer. No. 1 Tunnel on the main vein has been driven 700 feet and they have run a second tunnel some distance on the main vein with a view to striking the ore body at depth. Other veins on the property have received attention, through open cuts and general surface work. Assays taken from a stringer in the main tunnel gave values as follows: Silver, 763 oz. lead, 62 per cent. Other assays of samples taken from different points on the main vein and from surface openings have given 100 to 200 oz. in silver, 40 to 55 per cent lead, and 8 per cent zinc.

"On account of the price of silver it is most probable that the present season will see all the properties lying between Slocan Lake and Kaslo, especially such properties as those lying on Ten Mile Creek, and through to the territory covered by the South Fork of Kaslo Creek exceptionally active. Some of the properties in this section which carry high silver values are, Enterprise, Bondholder, Neepawa, Smuggler, Chief, Richmond, Blackburn, Index, Gibson, Silver Bell, Utica and Arlington."

Pumping Out Provindence Mine.

The old workings of the Providence Mine at Greenwood are being pumped out, a full crew of men being at work.

Workmen's Compensation.

Special efforts are being made by the members of the Workmen's Compensation Board of British Columbia to acquaint the miners with the terms of the legislation under which they are acting. There has been considerable misapprehension as to the scope of the Statute in regard to the payment of workmen for injuries received in their employment, the belief in many quarters being that men were entitled to financial help when becoming incapacitated through ordinary illness. This matter was before the Provincial Legislature at the last session, when the extent of the authority of the Commissioners under the Workmen's Compensation Board was explained and it was promised that some form of relief to those unable to maintain their positions because of illness, old age, etc., would be placed before the legislators in 1920. In the meantime, as stated, the Commissioners are touring the Province and explaining just what their duties are, a meeting having taken place recently between them and the miners of the Britannia Mining & Smelting Company.

Western Coal Operators Ask for Independent Board to Control Coal Industries

The Western Coal Operators' Association of Canada presented a memorandum to the Industrial Relations Commission, which is taking evidence throughout the Dominion of Canada with regard to the relations between employer and employee, advocating the appointment of an independent board to take control of the coal industry in Western Canada. "Such a Board," the memorandum states, "should, in our opinion, be made up of one man thoroughly familiar with the problems of the operators; one man familiar with the problems of the workmen; and a third with such qualifications and experience as would commend him to all as a reliable chairman. The industry has reached a point where, although permission is granted to sell coal at a given figure, it is impossible to do so on account of competition from other fields, chiefly American."

Discussion and consideration of the position of the coal industry occupied practically the whole time of the Commission on the afternoon of Saturday, May 3rd, and the operators appeared to be one in the opinion that joint councils of the employers and employed could not bring harmony to the industry at the present time because most of the miners—85 per cent of them, according to a Drumheller operator—were foreigners whose ignorance made them a prey to agitators. It might be different were the proportion of English-speaking miners large, but that was not so, and was not to be looked for as most of such had enlisted, and many of those returning were not fit to go Back to their former work. The Board of Control which the operators recommended, it was thought, should have the same power as was given W. H. Armstrong, the wartime director of coal operations in District 18, U.M.W. of A. (Eastern British Columbia and the Province of Alberta.)

W. F. McNeill, secretary of the Operators' Association; John Shanks, manager of the Brazeau Collieries; Jesse Couge, operator; and W. S. Henderson, operator and Drumheller, represented the organization indicated.

After the presentation of the coal operators' memorandum, the discussion referred to took place. W. F. McNeill stated that two mines were on strike against the order issued by the director of coal operations, but he admitted that the strikes were unauthorized by the union officials. Discussing housing conditions, witness said there were no complaints from the permanent camps, but only from new camps where bunk houses had to be used.

The markets of the British Columbia mines were in Montana and Washington, and those of the Alberta mines in Alberta, Manitoba and Saskatchewan. Freight rates hampered the operators in competing with American hard coal in Manitoba.

John Shanks, manager of the Brazeau collieries, described in detail the arrangements made between his company and employees. They were situated 120 miles west of Red Deer and six miles from the nearest village. The government leased land to the miners through the company, which erected four-room houses at a cost of about $900, and rented to the employees at $10 a month, five-room houses at $15 a month. A subsidiary company ran a store in the mining village. The desire for better working conditions was one of the primary causes of discontent, which had become acute since the war began in 1914. "Blanket men," who brought their own blankets and slept in bunkhouses formerly, now were not content with such conditions. A hospital charge of $2 a month was made, and for this a doctor was engaged, and he paid a nurse and the staff of the institution.

Men in the mines, said the witness, are not disposed to slack or neglect their work, but they have become very independent. The "labor turnover" was very large, because many young men were employed, and when they had earned a considerable sum they went away to the cities and towns.

Two operators from Drumheller gave evidence, John Henry Gouge and W. S. Henderson. Mr. Gouge declared that the cost of getting out coal was $2.53 for labor alone, exclusive of the cost of management and overhead charges. He did not think that any operator would be opposed to joint councils, but they would be unworkable, because the employees, mostly foreigners, would not co-operate with them.

Mr. Henderson employed 150 men, but had practically shut down his mine since April 1. The price of coal was high, he said, because wages had been boosted to such a level as was unfair to the operator, to the general public and to the miners themselves. "If coal can be marketed at $1 a ton less, we can compete with the hard coal in Manitoba," he declared.

Mr. Henderson stated that there were 22 mines in the Drumheller district, each of which had its own small system of lighting and its own water supply. This is expensive business, and he suggested that the government should take over the mines, instal a central lighting and central water system, and thus cheapen the cost of running the undertaking. Enough slack coal, not worth shipping, was wasted in the vicinity of the mines, to supply fuel for a power station for all the mines. Housing conditions caused improvement, but the small mines could not carry out the work required. Attemps to run the mines amicably had been made, but "foreign-born agitators had upset the whole thing by Bolsheviki talk."

E. Mart, General Manager of the Canadian Coal Company collieries, the first witness at the meeting on Monday (May 5), made a distinction between usual labor unrest characterized as a natural social reform and the radical agitators, to whom he attributed present conditions of undue unrest to some extent.

So far as cost of living was concerned in his industry, calculations showed that the advance in wages had more than compensated for the advanced cost of living. He referred to the agitator whose responsibilities were not those of the ordinary British subject, but who earned from $10 to $20 a day as one of the chief causes of undue discontent. The radicals were largely left behind when the others went to war, and found a large and fertile field among new men of foreign birth not acquainted with British government. A census of their

workmen had shown 56 per cent to be Austrians, Slavonians of the smaller nationalities and Russians.

The witness was inclined to agree, however, that the high cost of living in other lines had caused some of the discontent. Another element was the placing in strange new trades of men and women taking the places of the soldiers. Still another was the psychological condition of mind of those who had relations, fathers, sons and brothers, killed at the front. He himself had been for years and was now a member of a labor union, and he felt that one cause of trouble was the desire of men to gain authority without accompanying responsibility. The only solution was a complete understanding of both parties. The proposed industrial councils, he thought, might be a help toward educating workmen for responsibility, as well as authority to prove to them that capital is not the enemy of labor but co-relative. He had every confidence that a means could be found whereby the employees could be induced to co-operate in solving the problem. It might be difficult, but he was optimistic.

PLACER GOLD MINING IN CARIBOO DISTRICT

Reporting on his geological survey work in the Cariboo District of British Columbia last summer, R. B. MacKay, of the Geological Survey Branch, Ottawa, asserts that over 4,000 feet of the old channel of Lowhoo Creek remains to be worked.

His observations are summed up as follows:

On Mosquito Creek exceptionally high values have been obtained from the old channels, which Mr. Hopp works by hydraulicking. The gold is coarse, with portions of the original quart matrix attached. The bedrock is cut by numerous quartz veins, from which the gold was probably derived.

The Waverly, on Grouse Creek, was recently taken up by Messrs. J. G. McLaren and C. W. Moore, of Vancouver, and will be actively worked by them this summer, rich returns being expected. On Slough Creek hydraulic plants are operated by Messrs. Hopp and Joseph Wendell. On Dragon Creek Mr. L. Muller is drifting on the old channel and obtaining favorable results. Messrs. John Bell and W. Thompson will operate on Mustang Creek. The Lightning Creek Gold Gravels and Drainage Company of New York has holdings on Lightning Creek, where drilling has shown high values in coarse gold, the water problem being the difficulty. On Perkins Gulch a rich gold deposit has been found by Messrs. L. L. Felker and W. S. Sparkes, $5,000 having been recovered from a piece of ground 100 feet by 150 feet. Mr. J. A. McPherson is prospecting for the old channel of Chisholm Creek by drilling. Mr. J. F. Williams is working Boulder Creek.

At Cottonwood Canyon, on the Fraser River, the Tertiary Mining Company of Chicago is working auriferous cement by milling. At Quesnel Mr. S. J. Marsh has taken up dredging ground on Marsh Creek and has done extensive prospecting. He is arranging to install a plant. A notable result of his work was the amount of fine gold and platinum recovered. The Quesnel Hydraulic Gold Mining and Developing Company has been operating at Twenty Mile Creek, where it has installed one of the most up-to-date hydraulic plants in the province. Arrangements are being made to save the black sand and concentrates, about 1,500 pounds of concentrate carrying gold and platinum being saved daily while the plant is running. On Keithley Creek Messrs. Harrison and Worth are working an old channel, which has given rich returns, $18,000 being obtained from 10,000 square feet. The International Dredging and Drainage Co. is operating on Horsefly River. The Western Mines Exploration Syndicate of Vancouver have been drilling on Black Creek.

Mr. McKay concludes that there is a possibility of an increase in mining deep ground, and that much of the area is suitable for dredging the extension of the P. G. E. Railway into Cariboo, greatly reducing the cost of installing plants. He considers the development of a large hydro-electric power plant would do much to solve present difficulties.

EVIDENCES OF OIL NEAR VANCOUVER CITY.

Dealing with the evidences of oil near Vancouver City, Charles Camsell, of the Geological Survey Branch, Ottawa, says:

"The whole of the low-lying country on both sides of the Fraser River is supposed to be underlain by sedimentary rocks of Eocene age, though at Sumas Mountain Cretaceaus rocks project through them. These Eocene rocks, which are made up of conglomerates, sandstones and some shale, are the possible oil-bearing strata, and the rocks from which the seepages of oil have arisen. There is, therefore, very little structural evidence in the district itself on which to base conclusions as to the presence or absence of commercial bodies of oil in these rocks, though it is only to be expected that the anticlinical structure, which obtains in these beds south of the international boundray line will be found in the beds of the Fraser River district. As far as the lithology of the beds is concerned there are great thicknesses of porous sandstones capable of acting as reservoirs for oil, but so far as is yet known there are relatively few beds sufficiently thick or impervious to constitute a cover capable of preventing the escape of oil to the surface."

Mr. Camsell's conclusions are that information obtained from natural exposures and drill cores does not yet indicate that the Eocene beds contain sufficient organic material to have produced commercial deposits of oil. He does not consider there is a reasonable possibility of the oil being derived from older sedimentary rocks, as at Sumas Mountain the Eocene rests on volcanic rocks, and on the north side of the Fraser on granitic rocks, neither of which is a possible source of oil.

Thin coal seams occur in sedimentaries of the Fraser Valley, and he quotes Tyrell's opinion that oil may be distilled from coal seams that have been intruded by dykes of igneous rocks, adding: "If this theory of origin is correct the seepages have no particular significance, and a commercial oil field is not to be expected. The evidence bearing on the original source of the oil seepages, and whether or not they denote commercial bodies of oil underground, is so scanty that definite opinions can not be expressed regarding the occurrence of an oil field in this district.

Sheep Creek.

Harold Lakes, superintendent, reports that about 200 feet a month are being driven on the new crosscut tunnel on the Consolidated, Motherlode, and Nugget properties, Sheep Creek. It is estimated that the tunnel will have to go between 2,700 and 2,800 feet before it strikes the vein. It now is in about 250 feet.

Restaking of Mining Claims in Ontario

THE KNOX CASE.

A case of considerable interest to prospectors was recently tried by the Mining Commissioner of Ontario, Mr. T. E. Godson. Some extracts from the decision are printed here. Two disputes involving the same issue were tried together. Mr. J. A. Knox was disputant and Mr. Peter T. Graham and Mr. C. B. Stevenson respondents.

On the 23rd of October, 1918, Stevenson staked and on the 24th, filed his application for Mining Claims 18605-18606, 18607 and 18608, the first property being recorded in the name of Peter T. Graham and the others in his own name.

On the 13th of the same month the same properties had been staked by J. A. Knox on behalf of himself and L. T. Ieach. He made application to record the claims within the time allowed by the Mining Act, but subsequent to the time the applications of Graham and Stevenson had been recorded.

The disputes were filed by Knox against the claims on the 29th of October and the Recorder transferred them to the Mining Commissioner for adjudication under Section 132 of the Mining Act.

It is admitted Knox had propriety of discovery and staking, but it is contended by the Respondents that the land was open for staking on the 23rd of October and that Knox had, for the purpose of his staking, improperly removed used and defaced stakes placed upon the properties by previous stakers and that the claims were invalid having been staked on Sunday.

If Knox's staking is valid, having priority, he would be entitled to the claims. The whole issue is can a Licensee use and adopt abandoned stakes placed on a claim by a prior staker and remark and place them for the purpose of his staking or must he make and fashion new stakes, and is a claim staked on Sunday valid.

Certain Old Posts Can be Used, But New Ones Better.

These properties had been staked many times and been abandoned or cancelled upon forfeiture occurring. As many as twelve old posts were seen by Knox at one corner on one of the claims. With few exceptions Knox removed or remarked posts found at the corners of the claims and adopted them as his own. He knew from Alex P. Campbell the last recorded holder of one of the claims that the properties were to be abandoned and that the necessary working conditions would not be performed and suggested in his evidence that this was the reason he used posts that were upon the properties. Knox was not able to say he had used any of Campbell's posts. It would appear from the evidence he felt satisfied that such posts as he used, squared or faced and remarked were those which had been erected by the precious holders whose interests had been forfeited and whose rights to the claims had been cancelled. His examination of the posts was made at midnight with the use of what is commonly called a "bug" which consists of a candle inside an empty can, and it was necessarily a cursory one, but he was prepared to swear that any posts so re-faced, squared and inscribed were posts upon which the inscription had been entitled obliterated by long exposure or were illegible and indicated they had been standing for a considerable length of time From the evidence it would appear that Knox did not interfere with posts standing upon a subsisting claim, but that he might have done so or have removed a post on a claim which abutted the claims he was staking was a danger he was exposed to, but fortunately avoided. I am satisfied the posts he used were properly placed, squared and inscribed. His use of old markings under the circumstances of his case I think valid. I do not commend the practice or encourage its adoption, but I am unable to see that it violates any provision of the Mining Act. I see no distinction between the remarking of a post formerly used and the adoption by the staker of posts used by other holders, but upon abandoned claims. The four corner posts are evidence of the adoption of a parcel of land upon which a discovery had been made. If the claim appropriated had been allowed to be cancelled or forfeiture had occurred through non-performance of working conditions or other essential requirements of the Act, then the posts ceased to have any value and their usefulness passed with abandonment or forfeiture. The posts would no longer be the property of the holder of the forfeited interest or cancelled claim and remained only as the mute testimony of a disappointed Licensee. That the remarking of such posts is a dangerous practice is not to be denied and it behooves all licensees to stake their claims that all possibility of attack upon the ground of defective staking is not left open. The procedure required by the Mining Act is simple and uninvolved and the right way is always the best and cheapest in the end. Profitable reference may be made to Reichen v. Thompson, M.C.C., Vol. 1., page 99.

In other respects I find there has been substantial compliance by Knox with the requirements of staking.

Sunday Staking.

Knox knew from a search made at the Recording Office when the work should be done and filed and knowing that it had not been performed went to the properties on Saturday, the 12th of October, with the intention of staking the claims early Sunday morning, the 13th.

Stevenson, in his evidence, said he understood the claims were not open for staking until the 23rd of October, the day he staked, but did not state how he arrived at that conclusion. Upon the hearing his Counsel took the objection that as Knox had staked on Sunday his staking was abortive and the lands were consequently open when his client staked on the 23rd of October. I was not given any authorities upholding Counsel's objection other than a reference to chapter 104 of the Consolidated Statutes for Upper Canada, an Act to prevent the profanation of the Lord's Day in Upper Canada, now to be found in R. S. O. (1914), page 2962, and the Lord's Day Act, R. S. C., Cap. 153, Sec. 5.

I am unable to find any direct cases upon the point. It does not appear to have been raised before by predecessor in office Mr. Price, and has not been in issue in the Province of British Columbia, as the Mining Act there provides that "Any location made upon Sunday or any public holiday shall not for that reason be in-

valid, any law or Statute to the contrary notwithstanding, and a similar clause is to be found in the regulations for the disposal of Quartz mining claims on Dominion lands in Manitoba, Saskatchewan, Alberta, Northwest Territories and the Yukon.

Generally the common law does not prohibit the doing on a Sunday of any act which otherwise is lawful or render void the act so done and unless it can be said the act of staking is within the words and contemplation of either the Upper Canada Statutes or the Dominion Lord's Day Act and makes void such an Act a claim staked on Sunday would otherwise be lawful. . . . . .

Knox styled himself by the occupation a Prospector. A Prospector might be said to be one who searches for valuable mineral and when found appropriates it by the Act of staking. He also is a vendor and purchaser of mineral claims and his duties may include that of a performing assessment work upon the claims staked. He requires a general knowledge of mining and the Mining Acts that govern in the territory prospected. The Act of staking is scientific, based upon a knowledge of and in compliance with the governing Mining Laws.

The Act of Upper Canada being penal in its nature should be construed strictly and no violence should be done to its language in order to bring people within it, but rather care must be taken that no one is brought within it who is not within its express language. A prospector or one who discovers and stakes a Mining Claim does not in my opinion come within the classes prohibited by this Statute. He is not within them any more than a Lawyer or Surveyor could be said to be and he is not in my opinion a workman or laborer in the sense intended by this enactment.

Section 5 of the Dominion Act is in the words as follows:

> "It shall not be lawful for any person on the Lord's day except as provided herein, or in any Provincial Act or law now or hereafter in force, to sell or offer for sale or purchase any goods, chattels or other personal property, or any real estate, or to carry on or transact any business of his ordinary calling, or in connection with such calling, or for gain to do, or employ any other person to do, on that day any work business, or labor."

This Section is much wider than that contained in the Upper Canada Statute. It includes "any person." There is no class distinction. Then can it be said Knox as a prospector having made discoveries and staked the claims on Sunday did an unlawful act within the meaning of this Act? The foundation of a Mining Claim is a discovery and without it a staking would be abortive. The discoveries in these cases were made without work or labor. They were known to exist. In other cases they are stumbled upon by accident, again they are made after diligent search and labor, but I am treating this concrete case and as I have said no work or labor was involved n the act of discovery.

A staking follows discovery. It is imperative under the Mining Act and its effect is an appropriation of the lands on which the discovery is said to exist. Then follows an obligation to perform certain working conditions and after their completion, if the holder has maintained his Miner's License in force, a patent or lease will issue. All of the different steps leading up to patent or lease are progressive and each requirement, which is automatic, must be in compliance with the Act or a forfeiture of the rights of the holder occurs. Until a patent or lease issues, a holder is a mere licensee or tenant at will of the Crown.

By Section 78 of the Act certain periods of time are fixed for the completion of assessment work. For the first period three months from the time of recording is allowed, and for each subsequent period a full year is given. Sundays or holidays are not excluded by the Act; each day of the respective periods count against the time allowed the holder.

A Miner's License is in force for twelve months from the 1st day of April in each year. The holder is a licensee from the Crown and while such may prospect for minerals and stake out mining claims on any Crown lands open for that purpose. During the duration of the license the licensee is unrestricted as to day or time.

By the operation of the Mining Act the work on the claims in question was required to be performed not later than Saturday the 12th day of October, 1918. Failing its performance, under Section 85, a forfeiture ipso facto occurred. The lands then became open for prospecting and staking and a licensee had the privilege at the instance of the Crown to go upon the lands for the purpose of effecting or making a discovery and its adoption by staking. The next day in this case was Sunday. The property was undoubtedly Crown lands and open for staking and there was no prohibition in the license from the Crown restraining or prohibiting such an act on Sunday. There is no stay on account of Sundays or holidays with respect to working conditions and the holder is entitled to every day of each of the fixed periods of time.

There is then, in my opinion, an implied right under the Mining Act of Ontario to prospect for minerals and stake mining on Sunday. By reasonable intendment and implication the right exists under the Act and its machinery operates towards that contingency. That is the intent, I take it, of the Legislature passing the Act.

The Dominion Act contains this proviso. "Except as provided herein or in any Provincial Act or law now or hereafter in force." . . . .

The Mining Act of Ontario is an Act or law in force, and while there is no express enactment such as is contained in the British Columbia Mining Act and in the Dominion Quartz mining regulations allowing a valid staking on Sunday, there is, in my opinion, an implied intent to be assumed from the operation of the requirements of the Act that such can be done. The act of staking is a link in the chain of the different requirements that leads to title by patent or lease. . . . .

I do not express an opinion whether the staking of a mining claim is within the words, "for gain to do on that day any work, business or labor." I prefer to place the onus upon the present Mining Act of impliedly granting such a permission and with that right I feel the Lord's Day Act cannot interfere.

A Prospector who separates himself from the comforts and protection of society; blazes a trail into unknown mineral zones and discovers mineral of value is serving not only himself but the public at large, and no unnecessary restraint should be placed upon his activities. I can appreciate one such who from absence of contact for an extended period being excusably forgetful of the day of the week. I can also understand the necessity for haste when the grub-

stake is running low and the distance between the Prospector and point of supply many miles away. If the adoption of a discovery under such circumstances should result, through the operation of the Lord's Day Act, in an invalidity and loss of a supposed right, undoubtedly it would be a distinct hardship and a rather serious interference with the work of a bona fide Prospector who had gone far afield and was entitled to the fruits of his labor. On the other hand the act of one who goes to a property with the avowed object of staking it on a Sunday is not to be encouraged, but you cannot separate the rights obtained by endorsing the one and condemning the other. The Statute if it applies embraces each staking. I confess a desire to obstain from finding that to stake a mining claim on Sunday creates an invalidity through the operation of the Lord's Day Act and yet I wish to be understood that Sunday should be observed as a day of rest and calm when the mind can be disassociated from worldly tasks. Nature, however, has its own quietening influence and it provides "Books in the running brooks; sermons in stones; good in everything."

If the Dominion Statute applies then the act of staking was not "lawful" which judicially interpreted means "illegal" without authority of law in violation of duty or enjoined by law.

In Stephenson's affidavit of staking he made the following deposition "That at the time of such staking out, there was nothing upon the said lands to indicate that they were not open to be staked out as a Mining Claim and I verily believe that they were so open and that the staking out is valid and should be recorded." He knew when he swore to the affidavit that Knox had staked and was in that sense in possession of the property and there were indication that the land was not open for staking. His explanation is that while he knew Knox had staked and would record his application he understood or was advised that Knox had not staked in compliance with the Act and the lands were consequently open on the 23rd of October. The affidavit unexplained was untrue, but it could not be said to be fraudulent. Stevenson should have filed his applications and disputed after Knox had recorded. In this way any rights Stevenson had would have been protected. He no doubt honestly believed Knox's staking defective and there was no intention to deceive and no one was misled. If otherwise entitled to the Claims, Stevenson's right would not in my opinion be precluded by the affidavit of staking filed.

NEW SULLIVAN STOPING DRILLS.

Drill engineers and manufacturers have appreciated for a good many years the fact that one type of drill could not be efficiently applied to all conditions of drilling. The old two-man piston drill is now used in a relatively small percentage of conditions. One-man piston drills, water hammer drills for drifting, rotating hand feed hammer drills for sinking, and air feed stoping drills for upper holes are some of the developments of the past fifteen years.

In each department of drilling, too, specialization has been found necessary with increasing competition and with the adaptation of new drills to work previously done by other means with less efficiency. The first air feed stoping drills brought out were practically all of one type, consisting of the drill cylinder proper, mounted on a reverse air feed cylinder, in which the feed cylinder remained stationary, and the air pressure carried the drill up to its work, supported on a piston rod between the drill proper and the feed cylinder. The feed cylinder was clamped in a trunnion on a column arm, or on a bar. These machines were offered for hard, medium and soft ground and for all conditions in drilling upper holes.

The Sullivan Machinery Company was the first to introduce in this country that type of pneumatic feed in which the feed cylinder is attached directly to the pneumatic hammer, the feed piston rod acting against an abutment. This type of pneumatic feed held supremacy for many years, and in fact is considered as the standard for non-rotating machines at the present time.

Modifications of this pattern made by the Sullivan Machinery Company included hard hitting stopers for solid ground conditions, light hitting stopers for soft ground and feed cylinders of different diameters to provide a lighter or a stronger holding power against the rock.

All of the earlier types of stoping drills were rotated by hand. Demands of the past few years from the field for a successful stoping drill include the following variety:—

(1) Light weight and small size to permit easy handling in high stopes.

(2) Automatic Rotation to relieve the drill runner of the incessant labor of turning the drill bit by hand, particularly in hot stopes.

(3) Satisfactory regulation of the strength of the feed.

(4) A water jet for laying the dust when drilling in sulphur bearing ores, or other formations in which dust is injurious to the health of the miner.

(5) Automatic lubrication.

These are general, outstanding features, to which must be added in the design of a successful stoper, the usual features of convenience in handling, cutting speed, air power economy, simplicity of construction, accessibility for repairs, staunchness, and ability to resist wear and hard service.

The first four of these elements need not necessarily all be combined in the same machine, but represent varying conditions called for by different fields. The last mentioned features are essential to success in any satisfactory stoping drills.

New Sullivan Design—For the past three or four years, the drill designers of the Sullivan Machinery Company have been studying conditions and developing new features with the object of producing stoping drills to more nearly meet these varying factors of the field. That their efforts have met with success in the types quite recently introduced may be judged from the encouraging reports received as to performance and popularity with operators in many of the characteristic mining districts of the country.

Two of these new standard Sullivan stopers are shown in the accompanying illustrations. Figure No. 1 illustrates the Sullivan Class DT-44 Light-Weight Hand Rotation machine and Figure No. 2 illustrates the Sullivan Class DT-42 Stoper with Automatic Rotation and Water Attachment.

The ingenuity of the designers and the flexibility of the interchangeable part system, which is a vital element in all Sullivan Drill design permits the following combination and arrangements to suit different field conditions: :

DT-44 Light-Weight Stoper, hand rotation, direct feed, dry, solid steel.

DT-44 Light-Weight Stoper, hand rotation, direct feed, with water attachment and hollow steel.

DT-44 Light-Weight Stoper, hand rotation, with reverse feed, either dry or water type, for solid or hollow steel.

DT-42 Rotating Stoper with Reserve Feed and solid steel, dry.

DT-42 Rotating Stoper with reserve feed, hollow steel and water attachment.

DT-42 Rotating Stoper with direct feed and solid steel, dry.

DT-42 Rotating Stoper with direct feed and water attachment, hollow steel.

It will thus be seen that it is possible to furnish a stoper for practically any field conditions, as to character of ground, nature of working or class of labor, which may be encountered. The Light-Weight Stoper is, as its name implies, a small, short machine, much lighter than any other stoper ever placed on the market. Its net weight is 66 pounds, and with the feed piston drawn in, it is only 48 inches long over all. This shortness permits convenient use in the most confined stopes to direct holes at any desired point, while its low weight enables one man to carry it into narrow working places or up ladders with the least possible difficulty.

The DT-42 Self-Rotating Stoper is available for hot stopes or other locations in which the demand is for a labor-saving machine. This is the first time that a salf-rotating stoping drill of satisfactory design has been placed on the market. The difficulty with rotating stopers has been of two kinds. (1) To provide a compact, positive means of rotation and (2) to furnish some practical means of retarding the feed, so that in starting a hole or in fitchery ground the feed may be controlled, positively and immediately. The difficulty with previously designed rotating stopers has been that in these two classes of work, the forward action of the feed, combined with the rotation of the steel, would throw the bit off the inclined surface of the rock, or into the seam or vug, so that a stuck steel or a crooked hole was almost sure to result, with equally sure results in loss of time and labor and frequent damage to the drill itself.

In the Sullivan Rotating Stoper, the rotating mechanism is of the same type, which has proved so successful in Sullivan DP-33 Rotator Hammer Drills and in the Sullivan DR-6 mounted water hammer drills. In this design, an extension bar, forming an integral part of the piston proper at the front end of the drill, is milled with alternate straight and spiral flutes or grooves, which engage a ratchet collar and a retaining bushing, the latter being screwed into the chuck bushing and transmitting the rotating movement to the drill steel on the return stroke of the piston.

The piston delivers a free blow on the drill shank, the ratchet turning with it. It will be noted that the parts comprising the rotation are all at the front end of the tool. There is no separate rifle bar and the piston is not weakened by a hole bored in the rear end to receive that part, as is necessary with rifle bar rotation. Experience with these new stopers, as well as with the standard hammer drills referred to above, has demonstrated that this form of rotation is substantial, positive and reliable.

The builders state that in their experiments with independent rotating motors mounted at the front end of the machine, it was found that the increased weight at this point caused the machine to be very unwieldy, due to improper balance. The present standard arrangement while it lengthens the machine, permits a good balance to be maintained, which enables it to be handled a great deal easier than would be the case if the extreme front end were over-weighted by a bulky mass of metal.

The second element in the satisfactory rotating stoper, namely, control of the feed, has been the result of much study and experiment and is provided in these machines by means of a hand retarder or brake.

THE MERCURY DEPOSIT AT SAVONNA.

Discussing the mercury deposits at Savonna, British Columbia, Charles Camsell, representative in British Columbia of the Geological Survey Branch, Mines Department, Ottawa, states in his annual report that these deposits occur at intervals along a belt 25 miles in length extending from the west end of Kamloops Lake northward to Criss Creek and southward to Tunkwa Lake.

The British Columbia Cinabar Company, operating in 1896, produced 10,557 lbs. of mercury from 150 tons of picked ore. The company expended over $100,000 in development, mining and retort plant for high-grade ore, followed later by a plant to treat the lower-grade ore. The latter was not a success, due to the losses in the furnace and not to the low grade of the ore. Mr. Camsell was of opinion that these deposits could have been profitably worked on the high prices for mercury ruling during the war. The grade of these deposits compares favorably with the mercury deposits of California, so that there is a prospect of the industry being revived and quicksilver added to the list of metals entering into the annual mineral production.

Mr. Camsell notes other localities where mercurial ores have been discovered, as Silver Peak, near Hope; Sechart, on Barclay Sound; the Kicking Horse River at Field and Golden; Boston Bar, on the Fraser River; Homatheo River, at the head of the Bute Inlet; Lillooet. Dr. V. Dolmage, of the Vancouver office of the geological survey, examined the Sechart deposit last summer, and reports finding considerable metallic mercury in the old dump, but none in freshly-collected specimens. The mineral occurs in a shear zone 20 to 50 feet wide, and Dr. Dolmage states that "with properly conducted prospecting an orebody of economic value might possibly be developed."

THE GUN CREEK COPPER DEPOSITS.

In his report on the Gun Creek, Copper Mountain, deposits, Charles Camsell, Dominion Geologist, makes some interesting observations relative to this property which, it is reported, has been bonded and is likely to be extensively developed. In regard to transportation he states that a railway following the valleys of Bridge River and Gun Creek would be eighty miles in length.

Copper Mountain has an altitude of 8,000 feet, and the valley bottom above the 6,000 contour line shows the bedrock well exposed. The ore-bearing formation is grano-diorite, with inclusions of stratified rocks. The grano-diorite is intruded by a grey diorite porphyry. The greatest amount of mineralization is in a fractured zone traceable up the mountain for a distance of 1,000 feet or more, and with a width of from 500 to 600 feet. This zone is traversed by numerous porphyry dykes. The fracture lines are filled with narrow seams of quartz and calcite, carrying pyrite, chalcopyrite and sometimes magnetite. Other zones

of fracture showing similar mineralization occur both north and south of the main zone. Samples indicate that the silver is an important constituent.

Mr. Camsell notes that owing to the geological conditions, other deposits of metallic ores may occur in the neighborhood, stating: "The deposits are situated on the eastern border of the great coast range granodiorite batholith, where this batholith is in contact with stratified rocks of both sedimentary and volcanic origin, and experience has already shown that it is under such geological conditions that a great many of the deposits of metallic ores of the North American continent occur." Of the Gun Creek Copper Mountain deposits Mr. Camsell concludes: "The nature of the deposits and the large area over which sulphide mineralization extends would suggest the possibility that a large low-grade copper deposit might be developed which could stand the heavy expenses which must be incurred before the stage of actual production is reached."

OVAL-SHAPED ELECTRIC FURNACE.

Electrical furnaces were first placed in commercial operation in this country 11 years ago, and since then many types have been designed. Among recent types to be developed is the Vom Baur furnace, which is manufactured by the T. W. Price Engineering Co., New York. The shell is made of steel and is lined with firebrick, the periphery of which assumes horizontally an approximately oval shape of such dimensions that an equal heat gradient is obtained at the intersection of the slag line and furnace hearth. The arched roof is reinforced with steel girders through which the carbon electrodes enter the furnace.

Two counter-weighted doors with water-cooled frames are provided. The furnace proper is fastened to two heavy cast-steel rockers which roll on horizontal bed-plate castings anchored to the foundations. One side of the rockers is geared and engages a rack in the bed-plate casting to insure non-slipping and an even tilting motion. The tilting motion of 29 degrees in one direction for pouring and 5 degrees in the other direction for removing the slag is applied by means of rocker arms fastened to heavy-steel wheels. Power is applied to the latter through spur and self-locking worn gearing which is actuated by means of a variable-speed motor equipped with a solenoid brake.

How the Heat is Produced.

The electric heat is produced in the furnace by means of arcs at the ends of the electrodes, the inmoving the electrodes up or down, thereby lengthening or shortening the arcs. The centre electrode is larger and carries approximately 41 per cent more electrical heat than either end electrode. The high-tension power line is connected to the transformers and the low-tension is conveyed to the electrode clamps by means of copper bus bars and flexible cables.—Iron Trade Review, April, 1919.

LE ROI, No. 2.

Interesting remarks in connection with the mining situation in British Columbia, and especially in regard to the Le Roi No. 2 mine at Rossland, were made by the chairman of the company, Lord Ernest Hamilton, at the annual meeting of Le Roi No. 2, Limited, held recently in London.

In this regard Lord Hamilton said that the conditions with which they had had to contend during the past twelve months had been extremely difficult. Their chief difficulties had been with regard to the smelting of their ore. At one critical period the smelter to which the company had regularly sold its shipments entirely declined to accept the ore on the ground of their own labor troubles. The smelting contract expired after the declaration of war, and the smelter refused to sign a new contract, but agreed to take the company's ore with such qualifications as might be forced upon them from time to time by labor or market difficulties. At one period the smelter's labor difficulties were so severe that they were unable to take any of the company's ore, and the directors therefore arranged for temporarily shipping it to other smelters, but the terms obtained were less favorable on account of the higher freight. After a time, when shipments were resumed to Trail, the terms were less favorable than those formerly enjoyed. All this militated seriously against the profits at the mine. In addition to those troubles, labor was very scarce, and very difficult to obtain, while the necessary supplies and materials were very much more expensive.

The actual mining operations themselves had been successful, and the same might be said of development work. Important discoveries had recently been made in that part of the property which was known as the No. 1 mine. Ore bodies of considerable promise had been located. These had hardly reached the productive stage at the end of the financial year, but they had since played an important part in ore production.

Sinking on the South Rodney vein had been resumed at the end of the year, and had since been further continued down to the 1,950 foot level, at which level exploration was in progress. Shareholders could hardly expect him to make any prediction with regard to the mine outlook at such a moment as this. All that he was in a position to say was that the mine looked well, and that if pre-war conditions existed prospects would be much more favorable. All they could do was to carry on mining operations on sound and recognized principles, and to hope for an improvement in smelting facilities and for a corresponding reduction in the cost of labor and materials.

C. H. Stewart said that the chief feature of development was the finding of high-grade ore in the No. 1 vein, which was to be identified with the War Eagle vein, west of the fault which dislocated it. Progress had been made since the end of the financial year, and it had become the principal producing stope. The stopes were full above the 600 ft. level. Work was at and above the 400 feet level, in progress to prove the existence or otherwise, of an upward continuation. It was not possible to resume the sinking as to the deep ore body for exploration of this until the close of the No. 1 vein having been successful of the year, but the winze had now reached the 1,950 foot level, where it had got clear of the intrusive dyke into favorable mineralized ground, and it was hoped that the westerly drive and crosscut at that horizon would find the downward continuation of the ore body, which had been so productive in the upper level.

As to the production since the end of the year under review, shipments in the first five months of the current year had been 7,500 tons; receipts had been $82,000, and costs $56,000, but the value of ore in transit at this moment was $10,600 less than it was at the close of the year. The last month's returns showed an improvement in grade. Settlements had been preliminary and partial, for since the armistice there was no official quotation for copper as defined by the smelter tariff.

Special Correspondence

NORTHERN ONTARIO.

Keeley Mine Re-opened.

After lying in idleness for the greater part of the past four years, the old Keeley mine, situated in the South Lorrain district, is to resume work within the week. Plans have been completed toward this end. Perhaps no other mine in the north has received quite so much notoriety as has the Keeley, due, not so much to the amount of silver which it has yielded, but, rather, to the fact that it was on this property where silver was first discovered which caused the rush to South Lorrain, and, later, the mine having figured in and having been partly responsible for the failure of the Farmer's Bank some years ago.

The mine was held under option by British interests at the outbreak of war, and an extension of time was given, to hold good "until one year after the war." At that time it was not expected that such a war could be waged for more than a few months; hence the long period of inactivity.

Palmer-Paine Co. Will Work Gowganda Property.

The Palmer-Paine Mining Company has been organized and will operate the property formerly operated by the T. C. 177 Mining Company, situated in the Gowganda district. The property adjoins the Miller Lake O'Brien as well as the Castle property of the Trethewey Company.

During the course of previous work a shaft was driven to a depth of about 210 feet. Arrangements have now been made to carry this work to a depth of 500 feet, at which point lateral operations will be conducted. N. R. Morrison is in charge of operations.

Installing Plant on Clifton.

A plant is being installed on the Clifton-Porcupine property, in the township of Deloro, and is expected to be ready for operation within the month. Ample finances, it is stated, are now in the treasury to assure the carrying out of a more or less extensive exploration and development campaign. A good deal of spectacular ore was opened up on the property some years ago.

Hurricanaw.

Navigation for river boats has opened on the Hurricanaw River, making boat travel possible from Amos on the railway to the centre of mining activity in the vicinity of the Indian Peninsula, as well as the Martin, and the Cisco mines.

Miller-Independence.

A special car is scheduled to leave Dayton and Germantown, Ohio, for Boston Creek. The car will carry a number of shareholders of the Miller Independence Mines, among whom are a large number of leading business men of both Dayton and Germantown. The party, it is stated, will arrive at the mine on May 26th.

Satisfactory progress is being made in the development of the mine. Also plans are being drafted for the proposed new 100-ton mill, the necessary finances having been provided for by the sale of a block of treasury stock at $4 per share.

The Miller-Independence Company is in the happy position of having the comparatively low capitalization of $700,000 divided into 700,000 shares with the par value of $1 each. Of this, some 500,000 shares were previously issued. About 50,000 of the remaining 200,000 shares are being sold, the block having been already pretty well subscribed for at $4 per share. It is now believed it may not be necessary to dispose of the remaining treasury shares in order to bring the mine to an important producing stage. This situation holds out great promise to the present shareholders.

Rapid Progress at Tough-Oakes.

During the second week in May the Tough-Oakes continued to make rapid progress. For the seven-day period the underground workings were extended 299 feet, or at the rate of close to one-quarter of a mile per month, thus setting a new high record.

The new vein opened up during April has been further developed and gives promise of adding considerably to tonnage. Also, cross-cutting at the 400-ft. level is proceeding at a rate that should result in reaching the vertical shaft on the Burnside, and thus make that shaft available for lowering and raising men engaged in these lower workings, both on the Tough-Oakes side as well as on the Burnside.

McIntyre Making Larger Output.

The McIntyre-Porcupine bine is now producing at maximum capacity, and is expected to wind up its fiscal year, ending June 30, 1919, with a record of 180,000 tons treated during the period. With mill heads having maintained an average of about $10 to the ton, it follows that the year's production should amount to about $1800,000. It is expected the margin of profit will be almost equal to one-half of the total output, or about $800,000.

During the year the McIntyre has disbursed three dividends, each amounting to five per cent, or a total of about $541,000. With this fact in mind it is expected an amount in the neighborhood of one-quarter of a million dollars may be carried to surplus. The surplus as of June 30th, 1918, amounted to $872,172.75, and the amount added this year should increase the surplus well beyond the million dollar mark.

A force of about 348 men and 48 machines are employed, constituting the largest force ever before engaged by the McIntyre. The main shaft is being continued from the 1,000-ft. to a depth of 1,375 feet, where a second main haulage will be installed. With the work well under way at the 1,375 ft. level, the main shaft will be continued to still deeper levels, and will thus become the deepest operation so far undertaken in the Porcupine camp.

Will Maintain Gowganda Road.

The Journal has been informed that the Ontario Government, following the completion of the macadam road from Elk Lake to Gowganda, will also provide for the maintenance of the road. It is proposed to engage an expert road builder for the work of construction, and the work will be under the direct supervision of Mr. Fullerton of the permanent staff of the government. The method of maintenance will consist of keeping one man engaged during the summer months, and equipped with a two-ton truck so as to repair any small breaks that may occur in the road surface. In this manner no difficulty in keeping the road in first class condition is anticipated. The Government will also provide for oiling the road at least once a year.

Speeding Up Work at Dome Mine.

With a force of between 250 and 300 men employed, the development of the Dome Mines is being gradually speeded up, and has now assumed large proportions.

It is planned to mill ore of an average grade of $7 per ton during the period occupied in getting up to capacity. While running for a time at the rate of 600 tons daily, it is expected, costs will amount to about $3.50 per ton. Later on, as the capacity is gradually increased to full, or 1,350 tons daily, the mill heads will be gradually lowered, until they ultimately reach the average throughout the mine, which is about $5.10 per ton. Operating at full capacity, it is learned, the costs should be reduced to between $2.75 and $3 per ton, as compared with $2.50 before the war. Therefore, the margin of profit is expected to amount to about $2.25 per ton when operating at full capacity and would be well in excess of dividend requirements at the former rate of 20 per cent annually.

Rich Ore Discovered at Chambers-Ferland Mine.

An important development has just taken place at a depth of about 300 feet on the Chambers-Ferland property of the Aladdin-Cobalt Company. Several rounds have been taken out of a vein averaging about six inches in width and containing silver values of about 2,000 ounces to the ton. The discovery occurred at a time when it was generally understood the old mine was about worked out, and when low grade ore was being shipped preparatory to cleaning up ready for curtailing operations possibly some time next winter.

There are indications that the present high grade ore shoot may be quite extensive. The shipment of low grade ore from other parts of the mine is proceeding at the rate of about twenty-five tons daily.

Silver Found on Farragh Property.

On the property formerly known as the Farragh Mining Company, situated in the township of Coleman, on the north side of the Kerr Lake Majestic property, a vein has been discovered in which silver ore is found to contain several thousand ounces to the ton. The vein occurs in keewatin formation, at a point where the keewatin extends into the diabase. The vein crosses the sixty-foot tongue of keewatin, and continues in the diabase. At the point where the high grade silver ore was opened up the vein is from four to five inches in width, composed of calcite, cobalt and native silver.

The property was formerly owned by the Farragh Mining Company, and was sold at auction a few months ago to Pete Farragh, for $10,200.

Ontario-Kirkland.

Exploration and development work on the Ontario-Kirkland property is being carried on at the rate of about 500 feet every thirty days, according to official information. An average speed of about 17 feet daily has been attained. With the completion of the shaft to a depth of 300 feet, a cross-cut was driven, and at a point 30 feet from the shaft the No. 1 vein was encountered, showing a width of about five feet of commercial ore. Drifting toward the west is under way, and values are increasing, visible gold being present. Also, the cross-cut is being driven toward the No. 2 and No. 3 veins, which parallel No. 1 in comparatively close proximity.

Adanac Ore Will be Treated at Temiskaming Mill.

The management of the Adanac mine has made arrangements with the Temiskaming Mining Company to treat a large tonnage of medium grade ore in the mill of the latter company, the arrangement being to treat Adanac ore in 500-ton lots.

At the same time the high grade ore encountered during the course of work will continue to be bagged.

Government Prospecting Parties.

Members of the Canadian Mining Institute are being urged by H. Mortimer-Lamb, secretary-treasurer of that organization, to support representations which have been made to Sir James Lougheed, Minister of Soldiers' Civil Re-establishment, asking for the establishment of a prospecting expedition headed by returned men, to explore and investigate the mining possibilities of these parts of the Dominion, of which little is known.

The suggestion is that the government should utilize returned soldiers in the work of searching for mineral under the auspices and direction of the Department of Mines. It is recommended that suitable territory should be selected in different parts of Canada, and that each section so chosen and defined be placed in charge of an officer of the Department, whose duty would be to act as general supervisor of the work of the exploration parties. Each of the parties would be under a mining engineer who is a returned soldier, and the personnel of each expedition would be made up of returned men who are qualified for the work of prospectors.

Mr. Lamb further explains the idea as follows:

"After making a discovery an officer of the Department of Mines would investigate it and upon his recommendation it could be opened up. If the showing is found to be promising the Government would invite the larger exploration companies to send their representatives to make an examination and give them an opportunity to secure a working bond on it with the option to purchase.

"Of the monies realized from the sale of properties, 75 per cent would be retained by the government and would go towards defraying the expenses of the explorations, while the remaining 25 per cent would be divided among the members of the party responsible for making the original discovery. This latter provision is suggested as being not only a fair one, but as as an incentive to activity on the part of the men who enter this service."

Cobalt Views on Shining Tree Area.

Among the representative mining men in the precious metal mining fields of Northern Ontario, considerable discussion is heard relative to the situation in the West Shining Tree district where a number of professional promoters are advertising stock in prospects at prices for which shares in proven mining concerns may be purchased. The tendency on every hand appears to lean toward advising caution when delving or speculating in propositions where the older established mining concerns have hesitated to venture, after having made investigation. Not much real development work has yet been done on the promisng prospects found in the West Shining Tree field, where the deposition of gold is found to be spectacular at times, but is decidedly patchy.

Important Development at Nipissing Mine.

One of the most important developments met with in the Cobalt district during recent years, is the huge oreshoot opened up in vein 109 on the Nipissing mine. So far about 170 feet of drifting has been done, and the average silver content of the vein is high.

Some of the most optimistic statements made on the street are to the effect that the vein averages four inches in width and may be expected to be at least 100 feet in depth, and contains average values of about 6,000 ounces of silver to the ton. This would point toward there being about 3,600,000 ounces of silver in the shoot. While this report is probably over optimistic, yet it is interesting to note an official statement made in the Journal last week that the vein had then been drifted on for about 130 feet and had averaged about two inches in width of 3,000 ounces ore. Should this shoot prove to be 100 feet in depth it would contain about 1,500,000 ounces of silver.

The Nipissing management has always been noted for being very conservative when estimating ore, and while the reports that 3,600,000 ounces have been placed in sight may be somewhat high, yet it is a fact that the shoot is exceptionally large and may reasonably result in the company redeeming its former position as regards ore reserves as of the close of 1917 which were about 8,000,000 as compared with a decline to about 6,000,000 ounces at the end of 1918. In doing this the company is making still more secure its position of being the leading silver mine in the British Empire.

Resume Work at South Lorrain Mines.

Arrangements have been made to resume work at the Pittsburg-Lorrain and the Wettlaufer mine in South Lorrain. It is planned to re-open the mill of the Wettlaufer, which is under lease to the Pittsburg-Lorrain.

The present plan of operation does not include underground work, but is confined to the retreatment of the tailings dump from previous operations. Horace F. Strong will manage the operation.

Business men of South Porcupine are planning a more or less extensive building program, following the loss of a score of buildings in the fire which swept the western part of the town recently.

Kirkland Lake Gold Mines.

The Teck-Hughes is now producing at about full capacity. During the month of April a total of 2,602 tons of ore was treated, containing an average of $10.46 per ton, according to official advice. This appears to indicate a production of $27,216.92. The mill treated an average of upwards of eighty-six tons of ore daily.

With the Lake Shore mine having produced $44,781.56 in April, the Teck-Hughes having produced $27,216.92, and the Kirkland Lake Gold Mines producing about on a par with the Teck-Hughes, it is evident these three mines are now producing at the rate of about $100,000 every thirty days. That this output will be gradually increased within the next few months is probable.

In the meantime the Tough-Oakes is developing ore at a rapid rate and will reopen its mill some time during the summer, and the Wright-Hargreaves is proceeding with the construction of a large new mill. These two mines will be producing in a big way before the close of the year, and it is calculated the combined output of the mines of the Kirkland Lake field will aggregate about three million dollars during 1920.

In addition there are a number of smaller mines that should in due course add to the output. First is the Kirkland-Porphry where the erection of a mill is already warranted. Second is the La Belle-Kirkland where a large tonnage of commercial ore is in sight and where operations may be resumed before very long. Third, is the Ontario-Kirkland where very favorable results are now being met with a depth. Fourth, is the Canadian-Kirkland, the property recently acquired under a working option by the Crown Reserve Mining Company of Cobalt.

In addition to these are a large number of promising prospects upon which considerable exploration work is being carried on.

Catherine Township Claims.

Arrangements have been made to explore the Angus and the Bent veteran claims in the township of Catherine, in the Boston Creek district. A small force of men have been taken in for the purpose.

Adanac.

The scope of operations at the Adanac mine is being enlarged, a third machine having been set to work this week for the purpose of opening up the main vein system at the 200-ft. level. Heretofore, the greater part of the work done has been at the 310-ft. level, and at which point a considerable quantity of low grade ore has been opened up, and several tons of high grade ore has been bagged. Following the arrangement recently concluded with the Temiskaming Mining Company, the Adanac will begin shipping ore early next week to the Temiskaming mill for treatment. The content of the large tonnage to be treated will be returned to the Adanac in the form of concentrates following which the concentrates will be disposed of to the smelters.

Indian Peninsula Mill.

The new mill on the Indian Peninsula mine of the Penn-Canadian Company has been completed, and is now understood to be in readiness for operation. Early in June, it is planned to commence production. The Indian-Peninsula is a molybdenite property, situated in north-western Quebec, about twenty-two miles south from Amos on the Transcontinental Railway. The property was formerly known as the St. Maurice Mines. Mr. W. F. Haines, president of the Penn-Canadian as well as the Indian Peninsula has just concluded a visit to Cobalt, and although it is quite evident the market for molybdenite is more or less limited at the present time, yet the probability of a rapidly improving situation is good, and Mr. Haines appears to be very confident as to the future of the mine.

Exploring Hohenaur Property.

Exploration work has been resumed on the Hohenaur property, formerly held under option by the Temiskaming Mining Company up to the time of the change in the control of the latter company. At the time the Temiskaming dropped the option held on the Hohenaur, a plant had been installed at the expense of the Temiskaming. This plant was left on the property, adequate reimbursement being made to the Temiskaming. H. Cecil and S. Renaud are behind the present program of operations.

Chambers-Ferland.

As a result of the recent strike of high grade ore at the Chambers-Ferland mine of the Aladdin-Cobalt Company, upwards of sixty sacks of high grade ore have already been bagged, and a considerable tonnage of mill rock has been opened up. Further work is proceeding along the vein, and the outlook for additional high grade is stated to be quite promising.

Ontario Kirkland.

According to official advice to the Journal, the No. 2 vein has been cut at the 300-ft. level of the Ontario-Kirkland property, at which point the vein shows is said to be well defined and apparently well mineralized, although assay results have not yet been ascertained.

The manner in which the veins of the Canadian-Kirkland are developing at the 300-ft. level, particularly the No. 1 vein, has led the management to consider the advisability of installing a mill later on in the year. The trend and result of developments during the next few months will probably decide the course to be taken.

Greene-Kirkland Gold Mines.

Among the new companies formed for the purpose of operating property in the Kirkland Lake field is the Greene-Kirkland Gold Mines, with a capitalization of $3,000,000 divided into 3,000,000 shares of the par value of $1 each.

Miller Independence.

In the "D" or incline shaft on the Miller Independence Mines at Boston Creek, drifting operations are again under way. It is planned to develop as much ore as possible at this level so as to provide tonnage for the 100-ton mill which the management has decided to erect. In the meantime, diamond drill operations are making satisfactory headway from the 200-ft. level of the new central shaft. It is expected the main vein will be tapped at a vertical depth of about 300 feet.

Lake Shore.

The Lake Shore mine produced $44.781 during the month of April, according to official information. The mill ran 96.6 per cent. of the possible running time, reducing 1,800 tons of ore and recovering $24.88 per ton, or an average of $1,492.72 daily.

This compares with an average daily output of $1,463 in March, during which period the ore averaged $24.46 per ton.

Canadian-Kirkland.

The shareholders of the Canadian-Kirkland Gold Mines Company will hold a meeting in Haileybury May 28th, for the purpose of considering, and if approved, ratifying an option agreement whereby Sir John Carson, representing the Crown Reserve Mining Company is given an option on 800,000 shares of the Canadian-Kirkland Company on a working option basis. Also, the shareholders will be asked to ratify a by-law recently passed by the directors authorizing the sale of 400,000 shares of treasury stock at 25 cents per share.

The Crown Reserve Company has already started work on the property, and the situation points toward the probability of the shareholders ratifying the deal on Wednesday.

Temiskaming.

It is understood in usually well informed circles that prominent interests in the Temiskaming Mining Company still entertain hopes of being able to secure the Dolly Varden Mine, in British Columbia, despite the fact that the Taylor Engineering Company have been reported to have outbid the Temiskaming.

Whereas the Temiskaming bid $900,000 for the Dolly Varden, it is understood the Taylor Engineering Company has bid $1,100,000. On just what grounds the Temiskaming interests base their hope of still competing successfully for the Dolly Varden has not been made clear. There even appears to be many reasons for hesitating to share such a hope, in the light of the trend of events during the past few months.

Silver Leaf.

The annual meeting of the Silver Leaf Mining Company will be held in Toronto on June 6th for the transaction of business that may properly be brought before the meeting.

May Reopen Hylands Property.

The reopening of the old Hylands property, lying between the Ophir and the Gifford Extension properties, is under contemplation and arrangements are expected to be concluded within a short time. It is understood a number of business men who are interested in the property have arranged for the necessary finances.

The geology on the Hylands is said to be favorable, the formation being keewatin overlying diabase. On the north side of the property the distance down to contact is not far, but the contact dips quite sharply and reaches a depth of perhaps 400 feet at the southern boundary.

Berry Claims Optioned.

Interests close identified with the McIntyre-Porcupine Mining Company have secured an option on the Berry group of claims in the Kirkland Lake gold district. The Berry group are situated along the boundary between the townships of Teck and Lebel, and adjoin the Burnside mine on the south. The property consists of five claims comprising a total of not far under two hundred acres.

It is interesting to note that the McIntyre-Porcupine is the first important Porcupine mining company to interest itself in the prospective area of the Kirkland Lake district. Perhaps no other mine in the Porcupine fiel dhad a greater struggle to succeed than did the McIntyre on its Porcupine property. For many months at one point of development it appeared as though the proposition would go down as a failure. Perhaps the two chief reasons why the McIntyre did not experience such a fate was the fact that it was backed by such a competent man as the late Col. A. M. Hay, and with the work being done under the management of the present manager, R. J. Ennis. The company's entry into the Kirkland Lake field, although yet only to the extent of holding an option on an important group of claims, shows the aggressive policy of the McIntyre. Having firmly established itself as the third largest gold mining concern in the Dominion, it is evidently not the intention of the company to limit its ambition even to its present very favorable position.

BRITISH COLUMBIA.

Granby.

The last quarterly dividend of the Granby Consolidated Mining & Smelting Company was at the rate of $1.25 a share, amounting to $187,481, and making a total of $11,136,367 paid in 20 years.

Florence Silver.

The Florence Silver Mining Company operating in the Ainsworth, has mailed cheques for its monthly dividend (April) of $17,650. The rate is 1½ cents a share. Total disbursements amount to $35,500. In future disbursements will be made on the quarterly basis instead of the monthly system.

Gold Discovery at Terrace.

William Dahl, of Terrace, B.C., states that he has found free milling gold in paying quantity on a property which he and his partner have been developing for the past nine years in the vicinity of Terrace. A tunnel has been driven 180 feet, in addition to considerable stripping and surface work. The veins uncovered run from 18 inches to 14 feet in width, and the general average of the ore is said to return about $10 a ton. Seven claims, which are known as the "Lucky Seven," have been staked. A handsome specimen taken from the lower workings is on exhibition at the rooms of the Vancouver Chamber of Mines.

Geological Survey Work in B. C.

The season's work of the British Columbia Branch of the Geological Survey, Mines Department, Ottawa, commences this month. It will be conducted under the supervision of Charles Camsell, the well-known Canadian geologist. Several new fields are to be subjected to geological investigation and examination. One party at least will be sent to Northern British Columbia, and it is likely that the Alice Arm and Salmon River sections will be visited and reported upon. Nothing definite is yet known as to the policy in regard to the continuance of the investigation of the Tulameen platinum deposits.

Smelter Rates Enquiry.

The report of the special committee appointed to inquire into the justice or otherwise of the custom rates charged by the Consolidated Mining & Smelting Co. of Canada at its Trail (B.C.), Smelter, is expected to be available shortly. Messrs. S. S. Fowler, Ivan DeLashmutt and James Anderson, who constitute the personnel of the Committee, recently held a conference with Mr. O. R. Whitaker, the Colorado metallurgical expert, who has been employed to give technical advice, and the latter's findings are looked for in the near future.

Ore Receipts at Trail.

For the first four months of this year, some 65 mines contributed a total of 124,894 tons to the gross total of ore and concentrates received by the Consolidated Co. in Trail. This compares with 140,157 tons in 1918, and 146,395 tons in 1917 for the same months (four) respectively. Considering metal market conditions, which in the case specially of lead and copper, have been most chaotic, with almost no call for either metal, and then at nominal figures, the showing is encouraging, to say the least.

No ore whatever is being received from American mines, and comparatively little from mines in British Columbia other than those owned and operated by the consolidated concern itself. In fact, the tonnage from the company's own properties comprise about 86 per cent. of the total received thus far this year.

Metals still continue to pile up at the refining works in Trail, or are stored in other central points awaiting a market of some sort. However, no one can tell what that market will be when a demand does appear. It is hoped that this will eventuate in the near future to relieve the situation. Thus far American sellers have been able to dump their lead in the Canadian market at any price that could be obtained.

For purposes of comparison herewith is given the monthly tonnage ore receipts at Trail smelter, separately, for the last three years.

	1917.	1918.	1919.
January	36,570	27,404	35,283
February	40,967	33,989	30,450
March	42,949	41,725	30,809
April	25,909	37,039	28,352
Totals	146,395	140,157	124,894

Miller-Independence.

It is understood that a number of the directors of the Miller-Independence Mine and other shareholders from Ohio will shortly visit the mine at Boston Creek.

The directors are Geo. J. Miller, president; Wm. Stroop, vice-president; J. C. Schaeffer, secretary; Ed. Rettich, treasurer; Geo. W. Ozias, Judge O. B. Brown, Adam Begard, Frank Groch and J. A. Read.

Canadian Collieries Wins Case.

Judgment has been given in favor of the Canadian Collieries (D), Ltd., against the Pacific Coast Coal Mines in the action brought by the former for trespass and for the taking from its property without authority of a quantity of coal. Mr. Justice Murphy has allowed the plaintiff company damages of over $85,000. The defendant company's answer to the allegations mentioned was that the boundary marked and accepted was not the true boundary and that, apart from this point, it had permission from the late Mr. Coulson, manager of the Wellington Collieries at that time, to remove the coal in question. That the coal was taken was not disputed. The contention as to the boundary not being accurately shown on the map, the judge observes, was not very seriously upheld. The main defence as to the coal having been removed by Mr. Coulson's permission he has been forced to find "with great reluctance" not proven. His Lordship points out that the only man who could have contradicted this statement is dead. "I think the plaintiff's case is made out that there was a deliberate taking of coal with knowledge that it was beyond plaintiff's boundary line," remarks the judge in conclusion. He fixes damages at the rate of $3.25 a ton for 25,066 tons removed, and 15 cents a ton for 23,516 tons of coal left in place, but which is now valueless. The case, no doubt, will be appealed.

The Supreme Court of Canada has just handed down judgment in a case of a similar nature, in which the Canadian Collieries (D), Ltd., and the Pacific Coast Coal Mines figure as the principals. In this the latter have been ordered to pay $64,097.70 to the former as recompense for trespass and the removing of coal without authority. The Pacific Coast Coal Mines appealed from the Appellate Court of British Columbia to the Supreme Court of Canada, but the latter court has dismissed the appeal with costs, without hearing argument from respondents' counsel.

The Fires at Princeton Mines.

Ernest Waterman, general manager of the Princeton Coal & Land Company, is making every effort to establish the identity of the party or parties responsible for the fires which damaged the company's storeroom and destroyed the hoist at the mines on the morning of April 25th. For a time there was a suspicion that some of the strikers, who formerly were employed on railway construction near Princeton, were responsible. This theory is not now credited. It is said that there have been three fires at the mine in the past year, all apparently of an incendiary origin. On at least two occasions some of the fire hose was found to be cut and the hydrants tampered with. In the hope of solving the mystery and removing these annoyances by the apprehension of the guilty ones, Mr. Waterman has announced that the company will pay $500 for the necessary information and the police are making a special effort.

Surprise Mining Company.

Development operations are reported to have proved a considerable body of milling at the Ivanhoe Mines of the Surprise Mining Company, and there is a possibility that the Rosebery Surprise Mill at Sandon will be reopened.

Paul Lincoln, of the Noble 5 Mines, has returned from Salt Lake City, where he has been negotiating for the equipment of a new mill it is proposed to instal this summer. The headquarters of the Clarence Cunningham mining interests are to be moved from Sandon to new quarters adjacent to the Alamo mill site.

Mining Convention at Nelson.

The Board of Trade of Nelson, B.C., is asking the Provincial Government to support the International Mining Convention to be held in that City on June 19-20-21, by a vote of $1,000. It is pointed out that the Government aided the Vancouver Convention to the extent of $2,500 and also assisted that of 1918 at the City of Revelstoke, B.C. The mining men of the interior of the Province are enthusiastically behind those who are arranging for this gathering, and it is proposed inviting representative mining men from the adjacent States as well as from all parts of British Columbia. There will be a full discussion of all the problems affecting the industry of the Northwest and it is hoped that action will be decided upon that will have beneficial results. Incidentally visitors will be assured of ample entertainment.

Will Develop Gypsum Deposits at Falkland, B.C.

The British Columbia Gypsum Co., Ltd., announces its intention to develop its large gypsum deposits at Falkland, Grande Prairie, near Kamloops, B.C. A modern plaster mill is to be erected on the property. The Manitoba Gypsum Co., which is successfully operating in the prairie province, owns the greater part of the stock of the British Columbia Company. The decision to open up the Falkland property is believed to have been a result of the promise that a Kamloops-Okanagan Railway will be constructed, thus providing necessary transportation facilities.

Algeria's production of minerals in metric tons for the first three-quarters of 1918 included iron, 674,106; lead, 11,429; zinc, 37,297; pyrites, 10,976, and antimoney, 6,400. The report comes from Consul A. C. Frost, sfationed in Algiers.

New Machinery for Placer Mining.

An organization known as the Noble-Metals, Ltd., Vancouver, B.C., announces its intention to undertake active placer mining this season in the Omineca and other British Columbia Districts. It is said that entirely new machines and methods of recovery of gold and other previous metals from the placers of the Province will be used. A five-ton per hour capacity machine is reported to weigh less than 150 lbs., making it possible to transport it easily on horseback to "the most inaccessible parts of the interior." It also is stated that this machine, when necessary, may be operated by hand power. The company announces its intention of developing placer and other deposits on a royalty, lease, or percentage of gross earnings basis.

Canada Copper Corporation.

The strike of workmen who were engaged in the construction of a branch railway from Princeton to Copper Mountain, B.C., the latter being the site of new mines of the Canada Copper Company, continues at the time of writing, May 6. There are no signs of a settlement, despite the attempts of government officials and others at conciliation, and consequently the preparations which had been going forward on a large scale to put the company's mining property on a shipping basis remain at a standstill. The position of the Canada Copper Corporation is shown by the terms of the following notice, which was posted recently by instruction of the management:

Notice.

Any employee of the Canada Copper Corporation, who has joined the union of the railway strikers is hereby requested to withdraw from said railroaders' union or leave the employ of the Canada Copper Corporation.

The reason for this request is not that the Canada Copper Corporation is opposed to organized Labor (provided said organiaztion does not seek to establish a closed camp) but is very much opposed to giving support to the railroad strikers.

We consider that a minimum wage of 40 cents per hour for unskilled railway labor is a fair wage to-day, and that since the railway company is making no demand for a 10-hour day, they are not acting either unreasonably or unfairly, but, on the contrary, are both reasonable and fair. The fact that the great majority of laborers on the railway are employed by station men, means that the great majority are receiving 45 cents per hour instead of 40 cents per hour. Before the war the minimum wage on railway construction was $2.50 per day of 10 hours. The 40 cents per hour now offered is 60 per cent higher than the wages paid before the war.

If employees of the Canada Copper Corporation wish to join a miners', millmen's, or a smelter-men's union, they are at liberty to do so, but to join the railroaders' union they are merely helping the railroaders to tie up our mine and mill, and that means we will have to close up our works both at Allenby and Copper Mountain.

We intend that Canada Copper Corporation money shall not help support a strike that will close us down.

The notice is signed by the Canada Copper Corporation, Limited, per H. R. Van Wagnen, and is dated at Allenby, April 22nd.

L. F. Fogle succeeds F. C. Moore.

F. Cushing Moore, who has been associated with Clarence Cunningham as consulting engineer at the Hewitt and Van Roi Mines, Silverton, B.C., has severed his connection with the Cunningham interests and has left for Spokane, Wn. L. F. Fogle, former mill superintendent for the Consolidated Interstate Callahan Company, in the Coeur d'Alenes, recently took charge of the Hewitt and Van Roi Mills.

Mr. F. M. Sylvester's Views on Joint Council.

The Royal Industrial Commission, appointed by the Dominion Government to investigate and report upon the relations between employee and employer throughout the Dominion, met in British Columbia recently to take evidence. Among others heard was F. M. Sylvester, managing director of the Granby Consolidated Mining & Smelting Company, who expressed the fear that any effort to establish a joint council of employees and employers for the purpose of handling labor problems would have to be confined to units if it was to meet with success. He said that such a joint council might fail because there "is so much difference of opinion and such a wide chasm between the employer and the employee in many industries. In his opinion an organization of the kind would have to be built from the bottom and extended over a long period to meet with success. Mr. Sylvester told the Commission that he had not give the question any great study, but he thought that the results achieved by an industrial council would be in proportion to the provision made for the education of the men. Progress could only be by evolution. Each industry would have to work out its own salvation. To illustrate his position he pointed to the impracticability of two cities having an amalgamated government. This would not work out, and for the same reasons different units of industry could not be regulated by an industrial council with satisfactory results.

Coal Mining Branch for Institute.

The complete re-organization of the British Columbia branch of the Canadian Mining Institute has been decided upon and H. Mortimer-Lamb, the secretary treasurer of the organization, is in the Province for the purpose of attending to the details. As a result, there has been a meeting of coal mine operators at which it was decided that it would be in the best interest of this branch of the mining industry that it should have an entity separate and distinct from the metalliferous interests. The majority felt that the Institute's activities in this Province heretofore have been devoted to such an extent to the metal mines that those associated with the coal industry have been overlooked, or, at least, given so little attention, comparatively, as to make it scarcely worth their while to continue with the organization. They, however, realized the benefit of the work of the Institute, generally, and wished to continue to support it, but not on the same basis of the past. If a coal mining section of the western branch of the Canadian Mining Institute were launched they would give it their hearty endorsation, as it then would be possible to give problems peculiar to the industry the attention warranted by their importance: It appears that the same sentiment exists among the coal miners, who are members of the Institute throughout Canada and, consequently, Messrs. Thomas Graham, superintendent of the Canadian Collieries (D), Ltd.; John Hunt, General Superintendent of the Canadian Western Fuel Company, and George Wilkinson, Chief Inspector of Mines of British Columbia, all of whom have long been prominently identified with the coal mining industry of the province, have subscribed themselves to the following circular.

"It is suggested that a special section of the Canadian Mining Institute be organized in the interests of the members engaged in coal mining in Canada. This Section should have branches in Nova Scotia, Alberta, and Eastern British Columbia and on the Pacific Coast. May we depend on you to assist in organiizng a Coast Branch of this section, and also to give it your active suport after organization. It is obvious that such a branch will serve a most useful purpose in bringing the coal men together in their common interests. It is hoped, therefore, that you will reply in the affirmation to the above inquiry. Please address your reply to James Hargreaves, Technical Branch, Parliament Bldgs., Victoria, B.C., who has kindly consented to act as Provisional Secretary of the proposed coal branch."

These have been forwarded to as many of those identified with the industry in the coast district as possible. It may be that some have been inadvertently overlooked and, if so, they are requested to accept this notice.

On June 4th it is proposed holding a gathering of coal mine operators and others interested at Nanaimo, B.C., at which the organization will be completed and questions relating to the industry discussed.

Miners' Evidence Before Commission.

At the sitting of the Royal Commission on Industrial Relations held in Victoria on Monday, Robert Walker, member of the Cumberland Miners' Committee, said the results of the arrangements whereunder the grievance committee of the employes in the Cumberland plant of the Canadian Collieries (Dunsmuir), Ltd., meet the management every month or oftener if necessary, were good. Relations between the men and company had materially improved since the new management took charge.

One source of discontent among the men was the opinion that they were being denied the righ to organize. They feel they are under the absolute control of the management, and if the present management were changed that they might suffer at the hands of the new. While he did not know much of the Whitley plan of joint management and control, he felt that if it meant merely increased efficiency, there would be little gained by its adoption. But if the conditions under which the workers worked and lived would be improved it would undoubtedly prove beneficial.

Asked what he considered were the chief causes of unrest among the labor unions, Mr. Walker somewhat surprised his hearers when he declared it to be his opinion that the main cause was the idea the workers have of the corruptness of the union officials. He also referred to the labor troubles at Princton and the opinion of some of the men that police are being sent in with some ulterior motives. In the Cumberland district the workers feel they should have a greater share of the product of their labor. If they felt they would get something more along that line they would be more satisfied, though he supposed they would not be really satisfied, until they got it all.

He stated that the Cumberland men voted for the One Big Union idea, 169 to 5, and on the proposal of the six-hour day and five days a week only 12 voted against. There was no complaint about wages there, the chief demand being a shorter day. There was discontent, too, because of the men having to work with Asiatics.

Mr. William Fraser, employed by the Canadian Collieries Company at Ladysmith, said the present arrangements for the men meeting the management worked out fairly well. There is a branch of the union there, but the company did not recognize it. Opinion was divided, he said, as to whether the present committee arrangement was better than a union. The chief cause of discontent among the workers was the high cost of living. The last increase made under the system of readjustment every three months had been exactly two and three-quarter cents per day, while in the shipyards the advance had been at that amount per hour. No dissatisfaction has been expressed in the Ladysmith district with the eight hour day from bank to bank. The six-hour day had not be discussed, he said. Up to recently there had been little or no unemployment, but now that men were returning from overseas there was some. The company was putting returned men to work as fast as it could. He suggested some public works at Ladysmith which the Government should undertake to provide employment, among them being new wharf, extension road work, etc., as well as the re-opening of the smelter, thereby encouraging mine development.

The Rotherd Furnace.

The Industrial Committee of the Victoria Reconstruction Group, a body of business men banded together to forward the development of the natural resources of British Columbia, is urging the Provincial Government to lend its financial support to the end that the Rotherd Electric Furnace is established in this Province. It also is recommended that the water power available at Stamp Falls, Vancouver Island, be reserved in order that they may be harnessed to supply the necesarry electrical energy. Opinion is not unanimously in favour of immediate action, the view having been expressed by some organizations that the efficiency of the furnace should be subjected to careful investigation before the Province should lend its guarantee to the bonds which would have to be floated in the financing of the enterprise. It should be observed that the Reconstruction Group does not go on record as being in favour of the guaranteeing of bonds. On the other hand its resolution, which now is before the Executive Council, concludes as follows: "It is therefore urged that the industries of the Province should be developed by Provincial finances for the benefit of the community at large rather than for that of certain individuals." The Government, however, at present has only one proposition before it from those who control the smelter, namely, that it should go behind the latter up to a certain point in any issues that may be necessary. Incidentally, it is interesting to note that and ex-parte report on the furnace is not yet evailable. and that the Industrial Committee—a body composed of representatives of the returned soldiers' organizations—ask that action be suspended pending the result of investigations being made as to the practicability of the soldiers undertaking the operation of the suggested smelter.

Miners Want Assay Coupons With License.

The Free Miners' League of Prince Rupert has presented a petition to the Provincial Government asking that the Minister of Mines appoint licensed assayers at central points throughout the Province. It also is asked that the holder of a Free Miners' License Certificate, when purchasing his license, shall receive five assay coupons, each of which, on presentation to a district assayer, shall entitle him to one assay at half the current charge. These coupons, it is suggested, should be made valid only for the year of their issuance.

Officers for Nelson Convention.

A meeting of the Nelson, Slocan, and Eastern British Columbia Mining Associations was held recently at Nelson at which preliminary arrangements were made for the International Convention to take place on June 1920 and 21 at Nelson. An organization was appointed to prepare for the gathering, the personnel of which is as follows: Hon. Wm. Sloan, Minister of Mines, honorary president; S. S. Fowler, Riondel, honorary vice-president; Sidney Norman, Spokane, Wn., honorary vice-president; Frank C. Bailey Spokane, honorary vice-president; A. B. Trite, Fernie, honorary vice-president; J. J. Malone, Nelson, president; W. A. Cameron, Rambler, vice-president; A. N. Wallinger, Cranbrook, vice-president; Fred J. Peters, Rossland, vice-president; Alex. McCrea, Revelstoke, vice-president; J. R. Hunter, Nelson, vice-president; J. D. Blackwood, Nelson, vice-president; J. E. Thompson, M.P.P., vice-president; Fred R. Starkey, Nelson, secretary; J. A. Gilker, Nelson, treasurer; A. G. Larsen, Spokane; M. M. McCune, Sheep Creek; E. W. Widdowson, Nelson; I. G. Nelson, Nelson, and C. F. Caldwell, Kaslo, directors.

Rich Silver-Lead Ore at Woolsey Mine.

What is described as an exceptionally fine strike is reported from the Woolsey Mine at Silver Creek, near Albert Canyon and east of Revelstoke. Cross-cutting and other development has opened up a vein said to carry about fifteen feet of milling ore and twenty inches of very high grade silver lead ore.

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:-: EDITORIAL :-:

UNREST.

A protracted period of high cost of living has had its natural consequence—widespread unrest. Now comes a demand for shorter hours of labor, which would naturally lead to higher cost of production of essentials and consequently further increase the high cost of living. The unrest is not surprising, for the purchasing power of money has greatly depreciated. The long and costly war has imposed a great burden on people in all parts of the world. The endeavor of various classes to shift the burden onto others naturally bring discontent.

The labor unions are at present engaged in an endeavor to improve the condition of their members, and it is quite proper that they should do so. Other citizens will sympathize with members of the unions, but they also are affected by the high cost of living and they will not take kindly to a movement that will give costs another boost. The labor unions would be more popular with the rest of the community if they would endeavor to bring down the cost of living while maintaining wages at the present standard.

In the mining industry the eight hour day is already in force in Ontario for underground workers. It is generally necessary to have some of the surface men work a little longer. We need not expect any radical change in hours at Ontario mines so long as miners are willing to do a reasonable day's work. A miner can, if he wishes, do a good day's work in eight hours. A very much shorter day would, however, make mining a farce, and make inadvisable the furnishing of capital for developing and equipping mines.

In the search for properties and in their development much money is expended without any return. The workmen get their wages, but the men who supply the money are more likely to lose than gain. They run the risk in the hope of finding a prize; but the prizes are few. If there are no prizes there will be no one to risk the larger expenditures and there will be no new mines developed. The capitalist must depend on the miner to do his part and he must see that the miner gets a reasonable wage. The miner also must keep in mind the fact that those who supply money to develop mines are making profitable work for the miner. There must be co-operation or there will be no mining.

Mining is a hazardous occupation and the men who engage in it should receive higher wages than men of corresponding ability in many other occupations. Unless mining can be so conducted that all who engage in it can earn a decent living and enjoy a reasonable share of the good things of life we might better have no mining industry. If by unrest in other industries the cost of living is increased, is it reasonable for the miner to keep alive that unrest by supporting it in any way? In his own interest he should try to keep down the cost of living. It is reasonable for miners to unite their forces to obtain better conditions in their own industry, but it seems to us that in the present situation their natural allies are their own employers. They must, of course, make satisfactory term with their employers; but they might well recognize that they have in high costs a common enemy.

There has been much in evidence lately the term "collective bargaining." What this may mean needs definition in every case. In some cases, for instance, all the employees of a company might collectively bargain with their employers, or all the miners in one district might collectively bargain with the employers in that district. These are simple cases such as are of frequent occurrence. When, however, miners in widely separated districts unite and wish to deal with their employers through officials of such unions rather than through local unions, we generally find trouble. This trouble arises not so much from the method of procedure as from the history of the international unions. This has been the stumbling block in many cases. Now that several more years have passed, years of much greater consequence tha nany preceding ones, without the chief international union giving many indications of behaving as in the past, we might perhaps do well to forget its history and live more in the present.

Collective bargaining may also be interpreted to mean bargaining with employees or representatives of employees in some other industry. This seems to us, as indicated above, an unwise proceeding. The present conditions in some industrial centres seem likely to give their method of bargaining an unsavory reputation..

There is unrest in the mining districts as elsewhere. The gold and silver mines of Northern Ontario are in splendid shape to make a good showing this year. As compared with some mining districts the demand for labor at Cobalt, Porcupine and Kirkland Lake will be exceptionally good. It is reasonable to expect that the miners in these districts appreciate their good fortune. It is not possible, however, that they will escape the unrest bug altogether.

POWER FREIGHTER CARRYING ORES AND MINING SUPPLIES.

At the time of taking over the Dolly Varden Mines the Taylor Engineering Company is running the trials of its new large power freighter, the Teco, which will carry supplies and general cargo to all way ports en route to Alice Arm and to the Dolly Varden properties, and bring back cargoes of concentrates from the mine property. The Teco is intended to be the first of a fleet of power freighters for the British Columbia coast trade; the fleet to be controlled by the Taylor Engineering Corporation.

Additional interest is created owing to the fact that the crew of the new craft will consist entirely of men from the motor boat patrol service. She will be under the command of Lieut. E. C. Godfrey, who is the son of Mr. Godfrey, of the Bank of B. N. A., Vancouver, B.C., and who has recently returned from long service overseas.

The Teco was designed and built by the Taylor En-

gineering Company and has a 300 ton deadweight cargo capacity. She is so constructed that she can be turned into an oil tanker at seventy-two hours notice. She is 125 feet long with a 23-foot 6-inch beam and is driven by 200 h.p. Bolinder type engines. Her fuel capacity will give her a 1,600-mile cruising radius and she is designed to develop a speed of 8½ knots when fully loaded. She has accommodation for a crew of twelve men.

The Teco is to be docked after her trials and after the installation of a special quick-handling deck winch of a new type in about three week's time she is expected to take up her regular run.

FEDERAL EMBARGO ON GOLD EXPORTS.

The following letter addressed by the Mining Bureau of the Board of Trade of Vancouver to the Minister of Finance, Sir Thomas White, is of general interest to our readers, and points out clearly a weakness in the Federal measure which is intended to prohibit the free export of gold out of Canada:

"The Mining Committee of the Board of Trade of Vancouver note with pleasure that, with a view to conserving the financial strength of the Dominion the export of gold from Canada will be prohibited except with the consent of the Government. Permit us to point out to you that your regulation, however, only applies to gold in the bullion form. As a matter of fact five-sixths of the gold produced in British Columbia is derived from complex sulphide and copper ores, and while the ores mined by the Consolidated Mining & Smelting Company are now refined in this country and their gold product available to strengthen your gold reserve, the remainder is shipped out of Canada to American smelters and refineries, and you lose the benefit of that gold for your national purpose unless you provide that, for such gold exported in concentrates or blister copper, an equivalent shall be returned to the Treasury at Ottawa by the American smelters and refineries receiving the products from this side.

For instance the Belmont Surf Inlet Mining Company shipped to Tacoma Smelter in the State of Washington last year about $1,000,000 of gold contained in concentrates. The Tacoma Smelter has a refinery in connection with its smelter so that no hardship is inflicted on anyone by requiring the Belmont Surf Inlet Mining Company to arrange with the Tacoma Smelter for the return to the Dominion assay office at Vancouver of the gold bullion obtained from its concentrates.

While you cannot, of course, control American Smelters and refineries, you can provide that the Canadian Companies shipping gold under such conditions shall arrange to have that gold or its equivalent returned to Canada.

We submit that, unless you make provision, your purpose will be largely defeated, desirable as your policy is to conserve international credit; and venture to make the suggestions conveyed in this letter to make your plan as effective as possible.

We hope such a policy will lead to the refining in Canada of all metallic products of this country, to the national enrichment; the employment therein of our own people and natural resources such as the water power; and any co-operation this Bureau can offer you in such a policy will be cheerfully given.

Yours truly,

Secretary, Mining Bureau."

BRITISH TRADE FAIRS.

At the request of the Senior Trade Commissioner for the Imperial Department of Overseas Trade we have pleasure in giving publicity to the following circular announcing Trade Fairs in London, Birmingham and Glasgow, which would appear to offer good opportunities to Canadian manufacturers to advertise their wares in the United Kingdom.

The Senior British Trade Commissioner in Canada and Newfoundland, (Mr. G. T. Milne) is informed by the Imperial Department of Overseas Trade that Fairs representative of various branches of British industry will be held concurrently in London, Birmingham and Glasgow early next year. The London Fair will be organized by the Imperial Board of Trade, and the Fairs at Birmingham and Glasgow by the Municipal Corporations and Chambers of Commerce of these cities, but under the auspices of the Board of Trade.

These Fairs which have been held annually since 1915 were somewhat limited in scope during the war period owing to the restrictions which had to be imposed in the interests of munition manufacture. The future Fairs will; however, be on a scale commensurate with the magnitude of British industry.

For the purposes of the London Fair the Crystal Palace, which is the largest Exhibition Building in the world, has been secured. On the ground floor alone there are 14 acres of floor space. This Fair will embrace a wide variety of products, including cutlery, silver and electro-plate, jewellery, paper and stationery, fancy goods, brushware, drugs and druggists' sundries, musical instruments, scientific instruments, toys and sport goods.

The Birmingham Fair will include general and domestic hardware, tools and small machine tools, lighting fittings for electricity, gas, oil, etc.; India rubber goods, machinery belting of all kinds, motor cycles and cycles; accessories for motor cars, cycles and aeroplanes; sanitary appliances and a number of other items utilized in industrial and domestic construction.

The Glasgow Fair will embrace textiles of all descriptions, both in the piece and made up, boots, shoes and gloves, foodstuffs and beverages, and light and heavy chemicals.

The British Industries Fairs are not exhibitions—they are Trade Fairs to which admittance is restricted to "bona fide" trade buyers seriously interested, and admission is by invitation only.

Participation in the Fairs is confined to British manufacturing firms, which shall be deemed in this instance to be firms whose principal works and Head Offices are situated within the British Empire, and which are not controlled by Foreign interests. Exhibitors are not permitted to exhibit goods other than those they actually manufacture. From the foregoing it will be noted that Canadian manufacturers are eligible as exhibitors.

Full particulars may be obtained at the office of the Senior Trade Commissioner, 367 Beaver Hall Square. Montreal, and applications by Canadian manufacturers for space will be received by the Senior Commissioner up till 31st August next.

Education has been mentioned as a cause for discontent. This is to be regarded as a sign of progress. Insofar as discontent is the result of intelligent observation it is a virtue. We hope that there will always be much discontent of this kind in Canada.

Occurence of Elaterite, or Elastic Bitumen, in a Fluorite Vein at Madoc, Ontario*

By CYRIL W. KNIGHT.

The attention of the Ontario Bureau of Mines having been called to the occurrence of a peculiar bituminous substance in the fluorite vein of the Canadian Industrial Minerals, Limited, at Madoc, Hastings County, Ontario, the writer spent a short time in the early part of May, 1919, examining the deposit. Mr. R. C. Bryden, manager of the company, very kindly took the writer through the mine, and pointed out the location of the material. Specimens were collected and forwarded to Ledoux and Company of New York, and the material was determined to be "elastic bitumen," or "elaterite." Elaterite has not previously been found in the Province of Ontario, and its occurrence is not mentioned in Johnston's "List of Canadian Mineral Occurrences" published by the Geological Survey of Canada.

The fluorite veins at Madoc have been known for many years. They contain, in addition to fluorite, the minerals barite and calcite. It was only during the Great War that they were worked to any large extent. Mr. T. F. Sutherland describes sixteen properties around Madoc in which fluorite is found.† The deposits are also described in this Journal for June 15th, 1918, and in the Twenty-Second Report of the Ontario Bureau of Mines, Part II.

The veins intersect granites, schists, crystalline limestones and other rocks of pre-Cambrian age, and also fossiliferous limestones of Black River (Paleozoic) age. The deposit owned by the Canadian Industrial Minerals, Limited, occurs in a red and grey granite and has been worked to a depth of 200 feet. The elaterite was found on the 200-foot level, and was seen at the time of examination to occur sparingly — less than half a pound altogether—for several feet along the vein where the latter is two or three feet wide. It is not found in economic quantities. It has a dark brown color and occurs in vuggs in the vein material. In the specimens collected these vuggs are from a fraction of an inch to one or two inches in length and fractions of an inch in width. It was reported by Mr. Bryden that larger masses of the material had been found.

The description of the identification of elaterite by Ledoux and Company is given below:

"After superficial examination of the sample of bituminous substance associated with fluorite, barite, calcite minerals referred to in your favor of May 10th, 1919, especially with regard to the manner in which it melts and burns and the action of organic solvents upon it, we have little hesitation in expressing the opinion that it is elaterite, known also as mineral caoutchouc or elastic bitumen.

"Elaterite and similar bitumens are subject to change in composition due, in part, to more or less oxidation. There are a number of closely related compounds which have been given different names by different observers. The original mineral appears to be an unoxygenated hydrocarbon containing 86 per cent. of carbon and 13 to 14 hydrogen.

"The only way to positively identify the compound would be by ultimate analysis, but the sample submitted is insufficient for this purpose; at least, it is impossible to separate enough of the hydrocarbon perfectly free from the associated inorganic minerals to obtain an accurate analysis. We do not believe it is necessary to go to the considerable expense of ultimate analysis for the purpose of classification, since, if the mineral is not elaterite, it is at least something very close to it, and, furthermore, such authorities as there are on these minerals differ as to the composition.

"We would also call your attention to the fact that the bitumen in the sample is not uniform, part of it being more or less sticky and fluid, while the rest is of the consistency of crude rubber. This variation in consistency (and also in composition) is noted in Dana's Mineralogy."

It may be added that Mr. R. C. Bryder told the writer that he considered the material to be elaterite. This was before the sample was forwarded by the Ontario Bureau of Mines to Ledoux and Company for definite identification.

The origin of the elaterite in the fluorite vein is obscure. It may have been deposited at the same time as the fluorite, calcite and barite which now compose the deposit. If this is true, then possibly the elaterite may have had a volcanic origin, since fluorite is often considered to have been deposited from gases and vapours given off by igneous rocks. There are, however, no known igneous rocks cutting the Paleozoic beds between Madoc and Lake Ontario.

Another suggestion as to the origin of the elaterite is that the material descended into the vein from pools of oil which might have been present at some time prior to erosion in the overlying beds of Paleozoic limestones.

Whatever may be the origin of the material it is interesting to speculate as to the possible occurrence of a large vein of the material in the Madoc area, hidden somewhere in a valley or other depression. Southeastern Ontario has produced an amazing variety of minerals, some of them in paying quantities, such as talc, fluorspar, feldspar, graphite, mica, iron pyrites and other minerals. Perhaps the region has in store another surprise in the form of workable deposits of elaterite, or some other closely related hydrocarbon.

It is worth while recalling in this connection the deposit of the hydrocarbon known as albertite, which was found in New Brunswick many years ago. The occurrence is described by Frederick G. Clapp in a publication (No. 291, Vol. 2, page 59) o fthe Department of Mines, Ottawa, as follows:

"In 1849 Dr. A. Gesner discovered on Frederick brook near the present site of the Albert mines, a vein or bed of a bright, jet-black, shiny mineral, after-

*Published by permission of Thos. W. Gibson, Deputy Minister of Mines for Ontario.

†Ont. Bur. Mines, Vol. 27, 1918, pp. 136-138.

wards identified as mineral pitch or bitumen, and called albertite. This mineral proved on investigation to be of great value and was mined for nearly thirty years at great profit. The records of production were destroyed, but it was known that in each of the years 1865 and 1866 the output of albertite was 20,500 tons, while the total from 1863 to 1874 amounted to 154,800 tons, and during the entire period of working it was probably not far from 230,000 tons. The price ranged from $15 to $20 per ton.

"Albertite is a solid bitumen representing the residuum of petroliferous seepages. It occurs in veins in the Albert shales at several points in Albert and Westmorland counties. While in itself an indication of petroleum in past times rather than at present, it is generally associated with petroliferous shales, and in the Albert mine liquid petroleum was actually collected in buckets from seepages from sandy beds included in the shales associated with the albertite. Albertite is not a coal, notwithstanding the opinions of certain interested parties or legal decisions, but is a petroliferous residuum and therefore to be classed among the indications of oil, at least to the extent indicated above."

BRIDGE RIVER LILLOOET DISTRICT.

A party of geologists, from the Federal Government, in charge of Capt. W. S. McCann, who has seen service at the front, is making a survey of the geological formation along the Bridge River between Rexmount and Gull Lake in the Lillooet District.

This is the completion of the work, left unfinished by Mr. C. W. Drysdale, who was drowned in 1917. At the time of the drowning Mr. Drysdale's entire manuscript was lost. This necessitated the work being done all over. It is expected this will be finished this year.

THE SHORTER DAY.

Trouble has developed through the enforcement of the Provincial Eight Hour Act, which gives the eight hour working day to all workers in and around a coal mine. The underground workers had the Eight Hour Day. This legislation extends it to those employed on the surface. In the application of the measure, however, W. H. Armstrong, director of Coal Operations in District 18 (Eastern B. C. and the Province of Alberta), has issued an order permitting a reduction in wages proportionate to the time employed. Thus, in Eastern British Columbia, which embraces the Crow's Nest Pass Collieries, the men, while getting a shorter day by an hour, may expect a reduction in their pay. As a result orders recently came to the unions of Fernie and Michel from the Calgary, Alberta, headquarters of the U. M. W. of A. to take a ballot of the men to ascertain their feeling as to the declaration of a strike for the purpose of registering their resentment of the Armstrong dictum and, of course, to force the company to pay the same scale for nine as for eight hours. This was done and shows that the majority are in favor of the extreme step should it become necessary.

Further advices received to-day from Fernie make slight change necessary in my notes re enforcement of Eight Hour Day Law and its result, namely, the taking of a strike vote in District 18, the outcome being that the majority appear to be in favor of that course of action. It seems that the surface workmen in and about the Crowsnest Pass Coal Mines have been, generally, conceded nine hours pay for eight hours work, that is their wages will not be affected by the change in hours called for by statute. Some, however, notably the fanmen at Coal Creek, have been working ten and eleven hours a day. In cutting their working day to eight hours it is proposed that their pay shall be based on the nine hour rate, in other words, if they worked ten hours, one hour's pay will be taken from their wages. It is on behalf of men so placed that the strike is proposed and not, as suggested in my memorandum of yesterday, for the maintenance of the claim of all surface workers for nine hours pay for eight hours work. No definite action has yet been ordered from the U. M. W. of A. headquarters at Calgary and in the meantime W. H. Armstrong, the director of coal operations, is at Fernie conferring with the men and the operators with a view to the reaching of an understanding that will avoid the tying up of the coal mining industry of eastern British Columbia and Alberta.

WASAPIKA.

There is considerable interest now in the West Shining Tree gold area. It seems likely that the area will at last receive the attention it deserves. The good judgment and persistence of Mr. George Rogers, who has been responsible for most of the development work done in recent years, seems very likely to result in the adding of at least one mine to Ontario's gold producers. Mr. Rogers has been quietly plodding along and we are glad to learn that he is meeting with considerable success. If the Wasapika proves to be as good as it looks it will be a real mine.

Some good should come out of all the discussions that are now going on in the industrial world. It is reasonable to hope for a better understanding between employer and employee in the future. There is naturally a feeling of pessimism over the present situation; but after both sides have been presented and the differences adjusted Canada will undoubtedly begin a new era of industrial prosperity.

It has been brought forward as a cause for discontent that certain companies have published reports showing that they made very large profits. It is well to bear in mind, however, that it is customary to give much more publicity to successful ventures than to unsuccessful ones. Comparatively few men care to advertise their losses.

Molly Gibson.

The Molly Gibson, one of the properties of the Canadian Consolidated Mining & Smelting Company, situated near Kitto Landing on Kootenay Lake, which has been idle for some months, is once more shipping ore. The tram line, which was damaged by snowslides, has been repaired.

Pumping Out Suquash Mine.

The pumping of the water from the workings of the Suquash Mine of the Pacific Coast Collieries, which is situated some distance north of Nanaimo, B.C., on the east coast of Vancouver Island, is being undertaken. This mine was closed when the war broke out in 1914 and since has been practically deserted. It is understood to be the company's intention to put the mine on a producing basis at the earliest possible moment. The Suquash coal is of good quality and with adequate transportation facilities should be assured a ready market.

-:- Peace River Oil -:-

By J. J. RUTLEDGE.

This is the fourth successive year of drilling for crude oil in Peace River, Alberta, and the deepest depth attained to date is 1,155 feet. During the four years referred to six wells have been put down with not a dry hole in the lot. In more than one well the oil rose of its own pressure to a height of 425 feet in the well. One well is estimated by the driller at over 100 bbls. daily capacity.

These six wells cover a distance of about fifteen miles in a straight line from north to south and along the banks of the Peace River.

In the spring of 1916 the first well was drilled to a depth of 1,135 feet. At 930 ft. the oil producing sands were encountered, showing 70 feet of productive oil sands. At the depth of 1,100 feet salt water was struck which stopped further drilling on that well beyond the 1,135 ft. level.

The spring of the following year (being 1917) the second well was drilled, and on the 11th day of October the oil sands were reached at the 962 ft. level (this well being at a point one and a half miles south of well No. 1.)

When the drill had entered the oil sands to a depth of 17 feet in the sands, the oil rose on the first day to a height of 40 feet in well. The second day oil rose to a height of 90 feet in the well, and the driller gave it as his opinion, considering the rapidity with which the oil entered the well, that the well would bale 50 bbls. or pump 100 bbls. each 24 hours. Drilling was continued on down in the oil producing sands of this same well, No. 2, till the depth of 1,032 feet was reached, thereby making in all 70 feet of continuous oil producing sands. The oil here rose to a height of 425 feet in the well. With the above estimate of the driller to go from as a guide one may estimate the probable production with the oil at the 425 ft. level in the well. The 100 bbl. estimate taken from driller's statement of oil at time of being 90 feet in well on 13th day of October, 1917.

Not satisfied with this remarkable showing of oil at so shallow a depth, the company, or some other person or persons, in authority, decided to go on further down with the drill in order to reach what is persistently believed will be found the Great Sea of Oil below, and at the 1,085 ft. level entered salt water which continued on down to the 1,125 ft. level. Here the casing was set in eight feet of solid standstone and water was shut off successfully. It being now well on into cold weather, December, work was stopped for the short winter spell. During this interim the salt water broke the casing at the collar and let water into the well. The weather being cold it was impossible to shut it off. The next best thing to do was to move location again during winter, and the outfit was moved to a point six miles further south and still on the bank of the Peace River. Work was started during the summer of 1918 on well Number 3, with the result that at about same depth, 962 ft., the oil has been encountered, and it is hoped that better luck will follow this well than that which overtook the first two wells.

Across the river a well was put down last year. On approach of winter the oil was struck at 962 ft. and with the drill into oil sands for 30 feet the oil rose about 200 ft. when work was discontinued for winter. It is hoped that when the bottom of the oil sands is reached that a pump will be placed on the well and actual production capacity ascertained.

One mile south of this last mentioned well another plant has been installed. The drills are down some 200 ft. This summer good results are looked for here.

Two miles further south and on the same side of river bank a rig was working. At closing time for winter season last fall approximately 900 feet had been drilled.

On the opposite bank and on the east side of the river is another well down 1,155 feet and into oil. The operators have not yet commenced work this spring. Six miles south of well No. 3 mentioned above, and at the townsite of Peace River, is the well of the Consolidated Oil Company, a corporation capitalized for $2,500,000. This well is now down to the 1,139 foot level, with the drill into two feet of oil producing sands. From reports, which can be verified, it would appear as though this prospect promises to be as good as the best well above described.

On the opposite bank of the Peace River from the townsite, another company with an up to date rig of the Standard pattern is operating. This company is now hard at work drilling and the well is down about 300 feet. From indications of the formation passed through, and comparison with all the other wells, the wise men in the geological line assert that there can be no doubt but that good results will follow from this drilling also. So we have in all six wells to date that have pierced the genuine oil producing formation. It only requires now that pumps be placed on the property to determine the actual producing capacity.

It may be well to here call the attention of the reader to the fact that we have now a prospected field of some twenty miles in extent, with more than promising results and yet there is not the slightest evidence of what may be termed "An oil boom." What we have been anxious for is however happening in this field; an increase in drilling activity which will demonstrate to the world the existence of an old field here in Peace River. We do not desire a premature oil rush such as has taken place in very many portions of the globe. When we ship out by rail one car or a train load of the precious fluid, or "Liquid Gold" those living at a distance will soon learn of the Peace River Oil Field in Alberta.

Another item of great importance regarding this oil is the fact that by the cracking process it contains fifteen per cent. gasoline; fifty per cent kerosene; thirty per cent. lubricating oil, and one five per cent. residium, in the form of asphalt, this oil being of an asphaltic base. This we consider quite good enough. The oil is Sixteen Baume.

For the benefit of those interested in the production of oil in any country where transportation is as

good as it is here, this field being on a branch line of the standard gauge which connects with all transcontinental lines at Edmonton only 300 miles distant, it might be well to say: For the amount of territory covered to date and the shallow depth, approximately one thousand feet, and with a showing of over four hundred feet of oil in well from a uniform depth of seventy feet of oil producing sands, we are inclined to doubt if this condition for the amount of prospecting can be duplicated on this continent, and the end is not yet.

Another attractive feature exists here in this Great Dominion of Canada, and it is also mighty important to the investor, and it is this: The Dominion Government has a system of leasing in vogue which entitles the lessee of oil and gas leases from the Government to a lease of twenty-one years—with right of renewal of twenty-one years more, at the rate of fifty cents per acre per annum (with the proviso that a drilling plant be installed and in operation within the first eighteen months of the lease) it being the evident intention of the Government to encourage oil production, and more than that, the Government gives a bonus of fifty cents per bbl. on each and every barrel of oil so produced in the Dominion.

These conditions are generous. It is not going too far to say that an equal amount of liberality does not exist on the face of this globe in respect of the laws governing the securing of oil and gas leases from the Government of any country.

There is to date some three hundred thousand acres thus leased by our local people here, and it is not a difficult matter for any one who would desire to drill for oil to obtain a choice location under existing lease in good standing from the Government, upon very liberal terms as to a division of the oil without the payment of any cash down.

Of course, as soon as any one of these wells is placed on the pump and a certified statement of the actual production takes place, it is not out of reason to suppose that these leases referred to will be very much more in demand and as a result much more valuable than they would appear to the outsider to be to-day.

In conclusion, I wish to state that what is herein contained with regard to development and the field in general, can be taken as the actual fact, as I have been an actual resident on the ground from the first day of drilling here. I have the refined product, and a signed verification of the above facts by the drillers on the ground, together with the log and core of drillings. Experienced drillers make the statement that it is ideal drilling for a rotary, in which case a well should be put down in thirty days from commencement of drilling operations.

COAL LANDS CASE GOES TO PRIVY COUNCIL.

Two important actions, both involving title to the disputed coal rights of the Esquimault and Nanaimo Railway Belt, Vancouver Island, B.C., will come before the Privy Council in England this summer. Hon. J. W. deB. Farris, Attorney General of the Province, leaves shortly to appear before that court on behalf of the Province. One of these cases is that between the E. & N. Ry. Co. and H. W. Treat, the latter being a resident of Seattle, Wn. A lease was given the latter by the Provincial Government to certain foreshore on the east coast of Vancouver Island and to this the company, by virtue of the terms of the grant it received in the year 1884, claims the ownership. It may be stated that Mr. Treat proposes, if he is successful in his suit, developing the foreshore in question for its coal. From the Provincial standpoint its interest is to maintain the validity of its lease and to establish its authority to give such title. If the effect fails it follows that the company will have possession of all the foreshore on the east coast of the Island from Esquimault to Nanaimo, a distance practically as the crow flies of 80 miles and of indeterminate extent if the indulations of the shore line be followed. Then there are two cases of a similar character, namely, Esquimault and Nanaimo Ry. Co. vs. Dunlap and Esquimault and Nanaimo Ry. Co. vs. Wilson and McKenzie (Ganner Estate). In these Crown Grants to coal rights within the Railway Belt were issued to the defendants by the Provincial Government in accordance with the terms of the Settlers Rights Act, 1917. These Grants were issued by the Province during the interval elapsing between the passage of the Act by the Provincial Legislature and its disallowance almost a year later by the Dominion. The position taken by the company is that the Grants were vetoed automatically with the disallowance. If this is not controverted it is likely to have a serious effect on one large and important island enterprise of recent date, namely, that of the Granby Consolidated Mining & Smelting Company at Cassidy's Landing, to which some reference has been made in these columns. The Granby company holds its coal lands and, if the provincial title which it holds is found invalid, it may be in a serious predicament, as development has proceeded to the point that there is now a producing mine provided with modern plant and equipment. Besides coke ovens, which are understood to depend for their supply on the Cassidy Colliery, are nearly completed at Anyox, B.C., the site of the company's copper smeltery. For these reasons Mr. Farris's trip has a special interest to the coal mine operators of this Province.

Meanwhile the agitation among the settlers of the E. & N. Railway Belt, as a result of the disallowance of the Settlers' Rights Act passed at the last session of the Provincial Legislature by the Dominion Government, continues. A deputation of residents of the Newcastle District recently waited on Hon. John Oliver, Premier, and Hon. Wm. Sloan, Minister of Mines, to ask what action would be taken to secure them their coal rights in view of the course taken by the Dominion. It will be recalled that the Provincial legislation of 1917 was disallowed at Ottawa and that the Lieut.-Governor refused his assent to the re-enacted measure of 1918, this being done, it is assumed, on advice from the Capital. The delegation was informed that, in view of the attitude of the Federal authorities in 1917, and what has since transpired, there seemed little reason to believe that the 1918 legislation would be allowed, so that the chances of their having an opportunity to obtain title to their coal rights appeared to be slim. There are 180 settlers affected, at any rate that number of applications were under consideration at the time the Act was vetoed. These people propose now directing their representations to Ottawa and with that end in view a general meeting of protest is to be held at Nanaimo, B.C., shortly and it is considered likely that a delegation will be despatched to the Capital to present the settlers case, first hand, to members of the government.

HON. MR. SLOAN'S VISIT TO OTTAWA.
$100,000 For Ore Testing Plant.

That the Dominion Government is providing $100,000 for the establishment of an ore testing plant in British Columbia and that legislation is promised by the Federal authorities confirming the Provincial Government's action in throwing open Indian reservations for mining are two important announcements made by Hon. Wm. Sloan on his return to Victoria from the Canadian Capital recently.

In discussing with Hon. Martin Burrell, Minister of Mines for Canada, the matter of ore testing, Mr. Sloan pointed out the advantage of having the same established in connection with the University of British Columbia at Vancouver, B.C., and also suggested that an expenditure of $100,000 was scarcely adequate, it being probable that twice that amount would be necessary in order that the best results might be assured. Mr. Burrell, in reply, explained that a further grant could be made later if such was found to be the case and that in the meantime the $100,000 would permit a start to be made. As to the site of the proposed mill that was a question which had not been decided and the Dominion Minister could not concur in the view that it should be made an adjunct of the Provincial University. Mr. Burrell did not deny that it would be, if so placed, of great value in the technical training of western students while, at the same time, serving its purpose to the mining operators and the mining industry generally. But he took the position that if a precedent of the kind were established the central government would be called on to provide similar equipment in connection with all Canadian seats of learning. Mr. Sloan is extremely gratified that the Dominion Government has decided upon the construction of the plant although disappointed on the minor issue of its being made a part of the University. He thinks that it will prove a practical benefit of the utmost importance to those engaged in the development of the complex ores of some sections of the province, affording them a means of obtaining advice, without the expense and inconvenience of shipping ore to Ottawa for test, as to the most economical equipment to install for the treatment of the ores with which they are engaged.

Will Open Indian Reserves to Prospector.

As to the matter of Indian Reserves, of which there are large areas in British Columbia, Mr. Sloan informed the Dominion authorities that the province by legislation had thrown these lands open to the prospector, both under the terms of the Mineral and the Placer Acts, but that these amending Acts were inoperative until proclaimed law by the Lieut.-Governor. The latters' proclamation would be published when the Dominion Parliament passed confirmatory legislation, it being recognized that the Canadian Government was the final authority by virtue of being the guardian of the Indians. Mr. Burrell appeared to see no reason why reservations should not be opened and the Indian Department saw the matter in the same light. It, therefore, is promised that the necessary Dominion Legislation will be introduced at the session now in progress, whereupon Mr. Sloan asserts no time will be lost in recommending that these lands, which in many instances are highly mineralized and offer promising fields to prospectors, be declared free to the miner.

In the same category, almost, is the Dominion Railway Belt, a tract of land extending twenty miles on both sides of the C. P. R. in this province, and within the limits of which the control of minerals is divided between the Province and the Dominion. The precious metals are vested in the Province and the base in the Dominion. Mr. Sloan represented to the Federal authorities that the administration of these minerals should be in the Province, that until this was done their development would be retarded, and that the present unsatisfactory condition was stultifying the advancement of the mining industry. The Dominion Government, however, did not commit itself, taking the view that immediate action was not imperative and that this had best be left in abeyance until it was decided what course would be pursued in respect of the demand of the Prairie Provinces that large sections of their lands, now in the hands of the central government, be returned.

Another matter taken up at Ottawa by the Provincial Minister was the report that it was intended to remove the duty on fuel oil, to which proposal the coal operators of British Columbia have entered vigorous protest. They contend that the local market would be affected and that, as it is, the mines are not working to capacity. Mr. Sloan states that the viewpoint of the western producers was appreciated and that, in his opinion, the existing duty was not likely to be radically changed, if any amendment were made. The Dominion Government now controlled a large railway mileage in this Province and no doubt would use British Columbia coal, if for no other reason than to patronize home industry. The demand for the removal or reduction of the duty comes from the Prairie Provinces.

In regard to oil flotation Mr. Sloan was much interested in a demonstration of what is termed the alkaline process which he witnessed at Brooklyn. He says that, as far as he could judge, good results seemed to be obtained. While the oil flotation method in the treatment of British Columbia low grade ores had been a success the necessity of importing the oil needed made it somewhat expensive, and there now was an agitation among the companies using it for the reduction of the duty on this oil. If the alkaline process, therefore, proved in practical use to give the results claimed for it the industry might reap a very material benefit. On the probability of otherwise of such a development, however, he was not prepared to commit himself until more was known of the economical possibilities of the new process.

THE GOLD MINES.

In the gold camps of the north, particularly Porcupine, Kirkland Lake, and Boston Creek, the situation is gradually adjusting itself in favor of the gold mines, and all signs point toward the probability of the next few months and years being the most active and profitable ever experienced in the gold mining industry of Canada. In a number of instances the larger mines are adding to the scope of operations, while in numerous instances small mines are opening. In the case of the Hollinger Consolidated, work has assumed great magnitude.

Coke Ovens at Cole Creek Closed Down.

The coke ovens of the Crownsnest Pass Coal Company at Coal Creek have been closed down. Those at Michel, B.C., an adjoining colliery town, are expected to be able to produce sufficient to meet the present requirements.

WORK FOR THE CANADIAN MINING INSTITUTE.

Under the heading "The Canadian Mining Institute as a 'Prospect' for Canada and Canadians," the following statement of the opportunity lying before the institute, has been made by Mr. J. P. Macgregor of Toronto.

The success of the several Victory Loan campaigns has two definite lessons for members of the Canadian Mining institute: 1. Public support is the most powerful instrument in a free democracy; 2. Even the most astute of financiers had not hitherto guaged the miracles that could be worked by whole-hearted public support of patriotic purposes.

The mining industry has not had its just or fair measure of public support; largely, it may be said, because many, if not most, of the capable men associated with it have not grasped the completeness of the prevailing ignorance of the extent and value of the industry. Probably not one average citizen in ten naturally classes the mining industry as on a par with agriculture or general manufacturing.

Of necessity the development of the mining industry is, and has been, a matter of growth. The original settler of this country found the soil fertile; and so agriculture developed, and, as tools, utensils, supplies, clothing, etc., were needed, manufacturing followed.

But with the civilization of United States to the south at least half a century in advance of us industrially and with these infant industries—agriculture and manufacturing—to fall back upon, the development of the mining industry in Canada was artificially retarded by the comparative elimination of the spur of necessity; also the prominence of the precious metals in the early stages of the mining industry of this country, and together with the inevitable speculative excitement served to fix the mining industry in the public mind as a series of alluring speculations rather than as a stabilized and permanent industry. Hence, it is especially necessary at this time, when the reconstruction of the industries of the country on a solid and substantial and permanent basis is being surveyed, that the Canadian mining institute should be organized:

(a) To press for and obtain assisting legislation whereby the safety of the capital secured for investment in the industry will be protected by all the inviolability of a British Crown grant;

(b) To seek and secure adequate support for technical education and training to prepare for solving the problems incident to the development of the vast mineral resources of this country.

(c) To provide all possible freedom of investigation and certainty of investment in legitimate enterprises incident to the industry, and to make it recognized that in a free democracy it is inherently necessary to maintain watch and ward and corrective power over the hasty and ill-considered legislation inimical to the sound, legitimate and permanent interests of the industry;

(d) By our own voluntary effort, to justify a liberal expenditure on the plans of the various departments of the government for the development of the mineral resources of the country, and of the industries founded thereon, and to urge with all our weight and influence, and by all possible co-operation with the organization of other industries, the further prosecution of this governmental work along further and more adequate lines.

At this time, when reconstruction problems press upon us, when the mineral weath of the country eagerly beckons us to its adequate development as the surest and quickest road to that permanent industrial success, proved to be possible by the results of the past four years of munitionment effort; at this time when American capital is eager for investment in Canadian standards of character, initiative and energy; at this time, when the combination of these two elements of Canadian industrial success waits on the direction and energy of the Canadian mining institute, it is essential; it is imperative; it is the patriotic duty of the hour for us to see that the Canadian mining institute rise to its opportunity and speak for the mining industry in this country as the Canadian Manufacturers' Association, and as the United Farmers are speaking for their respective industries.

Our first consideration and duty is to convince the public that mining is one of our principal industries, on a par with agriculture and manufacturing, in fact that these three great industries are the basic pillars of our national industrial development.

CASEY MOUNTAIN SYNDICATE, LTD.

A contract for 200 feet of cross-cutting has been let on the property of the Casey Mountain property in the township of Casey, the working having been started recently.

According to official advice, the main shaft has reached a depth of 425 feet. During the course of driving the shaft a layer of diabase 320 feet in thickness was cut, instead of 270 feet as previously reported. Underlying the diabase is a layer of conglomerate ranging from 110 to 125 feet in thickness. Keewatin formation underlies the conglomerate. It is now proposed to carry out extensive lateral operations in the conglomerate formation.

The shaft was put down part of the distance on a strong fissure, which dipped out of the shaft, and which will be opened up in the present cross-cut. It is learned officially that commercial silver values were encountered during the course of work in the overlying diabase, average values of about thirty ounces, or some $30 to the ton being obtained at one point over a width of about ten feet.

The Casey-Mountain Mining Company, Ltd., with head office in Toronto, is the holding company, while the Casey-Mountain Syndicate, composed of interests in Regina, Sask., is the operating syndicate. Mr. R. G. Williamson is manager of the mine.

The mining plant on the property consists, in part, of a five-drill compressor, two boilers being 45 and 90 h.p. respectively, and a 6 x 8 hoist. The property consists of a group of claims comprising about 240 acres, and is situated about two miles from the rich Casey-Cobalt mine. A force of about ten men are engaged.

Not only is the geological structure at the Casey Mountain very similar to that found at the Casey mine, but is also very similar to that occurring in the most productive area of the Cobalt camp. Success would open a large prospective field, and one that should appeal to the larger mining companies, by reason of the fact that prospecting is made difficult owing to deep mining being necessary. It has often been said by leading mining engineers and geologists that the best place to look for new mines is in the neighborhood of proven mines. The Casey township area presents ample opportunity for putting the thought into actual practice.

INTERNATIONAL HIGH SPEED STEEL COMPANY EXTEND OPERATIONS.

To meet the requirements of their rapidly increasing business the International High Speed Steel Company have transferred their executive and main offices from 99 Nassau Street, New York City, to their works at Rockaway, N.J.

They have opened a branch office at Nos. 294-296 Lafayette Street, New York City, where they have secured a suitable and commodious warehouse.

The International High Speed Steel Company manufacture an extensive and varied stock of tool alloy and high speed steel, and also the celebrated "Bulldog" brand of Mining and Rock Drill Steel, both Hollow and Solid, in Hexagon, Octagon, Quarter Octagon, Round, and Cruciform Sections and in all sizes from ¾in. to 2in. diameter.

Mr. Wm. Garrow Fisher is president; Mr. Wm. T. Dunn, general manager, and Mr. John T. Mungovan, manager of the New York office.

They are represented in Eastern Canada by Mr. H. L. Usborne, Toronto, and in British Columbia by E. S. Prior & Company, Victoria, B.C.

SUNDAY STAKING IS LEGAL IN ONTARIO.

That a prospector may lawfully stake out a mining claim on Sunday, is the decision rendered by Mining Commissioner T. E. Godson, K.C., as is shown in a summary of Mr. Godson's decision, in the dispute of Knox versus Graham and Stevenson, printed in another column of the Journal. It is gratifying to note that Mr. Godson does not advocate nor does he encourage prospectors to stake mining claims on Sunday; but, that it is his opinion that where such is the case, the staking should not be made invalid owing to the operation of ths Lord's Day Act.

"A prospector who separates himself from the comforts and the protection of society; blazes a trail to unknown mineral zones and discovers mineral of value is serving not only himself, but the public at large, and no unnecessary restraint should be placed upon his activities," says Mr. Godson. Further, "I can appreciate one such, who, from absence of contact for an extended period, being excusably forgetful of the day of the week. I can also understand the necessity for haste when the grub-stake is running low and the distance between the prospector and point of supply many miles away," says the Commissioner.

Mr. Godson also says: "I confess a desire to abstain from finding that to stake a mining claim on Sunday creates an invalidity through the operation of the Lord's Day Act and yet I wish to be understood that Sunday should be observed as a day of rest and calm when the mind can be disconnected from worldly tasks. Nature, however, has its own quietening influence and it provides "Books in the running brooks; sermons in stones; good in everything."

Points brought out by the Commissioner, are these: In computing the time within which work must be performed on a mining claim, neither Sundays nor public holidays are excluded by the Act. A Miner's License is in force for twelve months, and during the duration of the license the licensee is unrestricted as to day or time, etc. In the case under review, the former claim reverted to the Crown at the first moment following midnight on Saturday, hence when Knox staked the ground on Sunday he was acting lawfully, according to the Mines Act.

INDUSTRIAL RELATIONS COMMITTEE AT COBALT.

The Industrial Relations Committee has concluded its labors in Cobalt. Among the points brought out might be mentioned the fact that before the war, the minimum wages in the gold mines was about $1.75 per day, as compared with a present wage of $3.50 per eight-hour day as the lowest paid underground workers at present. The eight-hour day is being generally recognized. The average wage paid for eight hours work in the gold mines is well over $4, while in the silver mines a like condition prevails. As an instance of this the Nipissing Mine may be cited, where, in the words of general manager R. B. Watson, the average paid to the employees of this, the largest silver mine in Canada, amounts to $4.34 for eight hours work.

Mr. Watson declared that he did not think it necessary to have an industrial council in Cobalt. He pointed out that as matters now stand, the employees of the mine have a committee which meets the management at intervals. The members of the committee are elected by the employees themselves, by secret ballot, and the system has proved successful. The attitude of the mine managers is made clear, and is this: they express their willingness to meet and to deal with representatives of their own employees and do everything to promote harmony and fair treatment, but they are not prepared to deal with the union, because it has its administrative head in a foreign country, and that it does not fully represent the majority of the mine workers of the camp, but, rather, represents only union members.

Chief Justice Mathers, when asked for an expression of opinion with regards the situation in Cobalt as compared with other parts of the Dominion so far covered by the Commission, stated that unrest was less pronounced in Cobalt than in certain points visited in the West.

After hearing the evidence presented from all parts of the district, and from various points of view, the situation in the mining districts has the appearance of being fairly favorable, and leaves the impression, that, after all, the chief bone of contention is not a question of wages and not conditions in general, but is due to the refusal of the International Mine, Mill and Smelter Workers Unions for failure to gain recognition.

The Dolly Varden Mine.

The Dolly Varden Mine, one of the most promising silver properties of the Alice Arm District, Northern British Columbia, is expected to be taken over by the Taylor Engineering Company. This concern constructed a railway from the Coast to the mine, which incidentally taps a number of other good prospects. The Dolly Varden Company failed to pay the Engineering Company all that was claimed for this work and, by virtue of legislation passed at the last session of the Provincial Legislature, the first mentioned company and the Temiskaming Mining Company, were given until May 19th to take care of claims amounting to $462,500. This they have not done apparently and the Taylor Engineering Company, therefore, has the power to take possession, its first responsibility on doing so being the discharge of wages due workmen amounting to about $150,000. This done the same concern has authority to proceed with the operation of the mine.

Special Correspondence

BRITISH COLUMBIA.

The Canadian Mining Journal issue of April 16, report of the Mining Committee of the B. C. Legislature regarding the Dolly Varden case was printed in full. In that report the Mining Committee decided that the Taylor Engineering Company, which met financial disaster in the construction of a railway from the Coast to Alice Arm, B.C., was entitled to payment in full of the cost of work done plus 10 per cent. contractor's profit. The committee took this position in order to protect the contracting company and its creditors before the Provincial Legislature should consent to the renewal of the railroad charter.

Under Bill 103 the Dolly Varden Company had until May 17th to pay wages and until May 22 to pay the balance of the claim. At this writing (May 20) the wages had not been paid and there were only two days more in which to pay the balance of the claim. If the balance is not paid on May 22, the Taylor Engineering Company are going to exercise the privileges conferred by Bill 103, and will then operate the property in accordance with the terms of the Bill.

The amount of the claim is $462,500. Mr. A. J. Taylor, of the Taylor Engineering Company states that his company is not in any way affiliated with any existing mining company and considers the property worth very much in excess of the charges against it. It is a high grade silver property on which over $1,300,000 has been actually expended up to the present time. The railway is fully equipped and the mine in full development with 2,000 ft. of tunnels.

Eastern B. C. Branch of Mining Institute.

Advantage is to be taken of the International Mining Convention to be held next month at Nelson, B.C., to launch an Eastern British Columbia branch of the Canadian Mining Institute. It also is stated that there will be a meeting of a joint committee to formulate a system whereby better co-operation will be established between the American Institute of Mining and Metallurgical Engineers and the Canadian Mining Institute. L. K. Armstrong, secretary of the A. I. M. & M. E. in a letter to F. A. Starkey, who is in general charge of the convention arrangements, states that E. P. Mathewson, New York, chairman of the A. I. M. & M. E., A. R. Ledoux, the member of the Canadian Committee, D. H. McDougall, Nova Scotia, and L. K. Armstrong, Spokane, along with W. G. Miller, Toronto, and R. H. Stewart, Vancouver, probably will be in attendance. Besides S. A. Easton, Kellogg, Idaho; P. N. Moore, past president of the A. I. M. E., St. Louis; J. H. Haas, chairman of the Columbia section A. I. M. E., and the president and secretary of the Associated Engineers, Spokane, Wn., are expected to be among the visitors. S. S. Fowler, Riondel, B.C., a member of the executive of the A. I. M. & M. E., is expected to advise the convention management as to the part of the technical portion of the programme the A. I. M. & M. E. will undertake.

To Conserve Gold Supply.

An extension of the existing Dominion prohibition upon the export of gold bullion, so as to include complex ore carrying gold, will be urged upon the Canadian Minister of Finance by the Vancouver (B. C.) Board of Trade. In discussing this matter one of the Board's members, Nicol Thompson, stated that the present legislation was designed to stabilize the country's credit and he thought the proposal was of the utmost importance, if results were to be assured. The greater proportion of the gold production of the Province was from complex ores and much of it was smelted at Tacoma, Wn., and other points outside British Columbia. It is proposed, as an alternative to the total prohibition of exportation that the Government make it obligatory that an amount of gold equivalent to the amount recovered outside the Province from provincial ores be returned to the exporting company. Such a policy, it was stated, besides making more effective the policy of increasing the country's gold reserve, might lead to the refining of all metallic ores in Canada.

B. C. Coal Output.

Coal output returns for the month of April are to hand and show that the total production of the collieries of British Columbia for that period was 197,180 tons. This is made up as follows:

Company.	Location.	Coal Tonnage.	Coke Tonnage.
Crow's Nest Pass Coal Co.	Coal Creek	26,788	337
Crow's Nest Pass Coal Co.	Michel	14,798	3775
Corbin Coal & Coke Co.	Corbin	5,315	....
Merritt Collieries, Ltd.	Merritt	3,300	....
Fleming Coal Co.	Merritt	2,604	....
Princeton Coal & Land Co.	Princeton	841	....
Canadian Western Fuel Co.	Nanaimo	54,825	....
Canadian Collieries, (D), Ltd.	Cumberland	51,037	....
"	Extension	19,326	....
"	South Wel'ton	6,574	....
Pacific Coast Coal Mines.	South Wel'ton	6,822	....
B. C. Coal Mines, Ltd.	South Wel'ton	2,011	....
Nanoose Collieries Co.	Nanoose	135	....
Granby Consolidated Mining & Smelting Co.	Cassidy's	2,804	....
		197,180	4112

Multiplex Mining Co.

The Elove Mining Company, situated at Camborne, B.C., Lardeau District, has been bonded to the Multiplex Mining Company, the consideration being $30,000, according to the statement issued. The property has been in process of development by the owners, John Kennedy and Roderick McLennan, for some years and a vein of ore carrying silver-lead, with high values in

Obituary.

John Bates.

One of British Columbia's pioneer mining men died recently in the person of John Bates, who was well-known among prospectors and operators of the Kootenay and Boundary districts of this Province as well as in Alaska. On leaving the American Army, Mr. Bates migrated to Nelson, B.C., which he made headquarters while prospecting the adjacent country. Subsequently he journeyed to Alaska and the Yukon among the placer grounds, of which he roamed for several years. He then returned to the interior of British Columbia, where he has since lived. He was about 70 years of age, and a native of Ireland.

Silver Standard.

With the mine again on a shipping basis and the plant in operation, the Silver Standard property, Glen Mountain, Omineca, is expected to be active. Work was resumed on the 1st of May. This is one of the largest producers of silver, lead, and zinc of northern British Columbia, and is gratifying to know that arrangements as to freight rates, treatment of concentrates at the smelter, etc., have been satisfactorily concluded, and that there is every prospect of clear sailing for the management. W. G. Norrie-Loewenthal, the manager of the mine, who, of course, has returned to his duties, had a conference with General Stewart, D. McLeod, and Angus Stewart, some of the chief owners, while on the coast and states that they have every confidence in the future of the property and of the district, it being their opinion that other producing properties would be developed in the vicinity.

The O. B. U.

The "One Big Union" is much to the fore in the Canadian West. The idea of such an organization started with the Calgary Convention of the Federation of Labor and since has been discussed by practically every union in the West and, if reports are to be credited, has been generally endorsed, so that nothing remains but to give it effect. Among the leaders in the Crowsnest Pass Coal District it is, of course, the leading subject of discussion. Recently John Potter, of Fernie, and a member of one of the Locals, District 18, U.M.W. of A. addressed a meeting at Trail, B.C., held under the auspices of Trail Union No. 105, International Mine, Mill and Smelter Works, his theme being the One Big Union. He was on a mission, it was explained, to obtain members for the O. B. U. one of the primary objects of which was to secure a six-hour working day and a wage of $1 per hour. He deprecated the action of the Calgary Convention in expressing sympathy by resolution with the Bolsheviki doctrines, but asserted that the workingmen should get what they want by a nation-wide strike through the O. B. U.

Silver Standard.

The Silver Standard Mine is in full operation again. Ore is being taken out and development is being pushed. The Mill is handling the ore satisfactorily and a carload of zinc concentrates is ready for shipment. Lead concentrates are to be sent to Selby Smelter, San Francisco, Cal., instead of to Trail, B.C. The explanation given of this change is that the American smelter handles a lower grade of concentrates.

Federal Support for Technical Education.

Federal suport for technical education aggregating ten million dollars within the next ten years, the money to be paid to the provinces is provided for in the following resolution of which notice has been given by Hon. J. A. Calder, minister of immigration and colonization: Resolved that it is expedient:

(1) To bring in a measure for the promotion of technical education in Canada.

(2) That for the purpose of promoting and assisting technical education in Canada, the following sums, aggregating ten million dollars, shall be appropriated and made available for payment out of the consolidated revenue fund of Canada, during each fiscal year for the period of ten years, beginning with the year ending the 31st day of March, 1920, namely: (a) During the fiscal year ending March 31, 1920, the sum of $700,000; (b) During the fiscal year ending March 31, 1921, the sum of $8,000,000; (c) During the fiscal year ending March 31, 1922, the sum of $900,000; (d) During the fiscal year ending March 31, 1923, the sum of $1,000,000; (e) During the fiscal year ending March 31, 1924, the sum of $1,100,000 and the like sum of $1,100,000 during each of the succeeding fiscal years until the expiration of the fiscal year ending March 31, 1929.

Such sums subject to the conditions of the proposed legislation shall be allotted and shall be paid quarterly as grants to the governments of the several provinces in proportion to the population of the said provinces respectively, as determined by the last federal census.

(3) That the grant payable to any province in any year shall not exceed the amount provided for each province by the foregoing resolutions, nor shall it exceed an amount equivalent to that which the provincial government shall expend on technical education within such year.

(4) That in determining the grant payable to any province annually no account shall be taken of any liability of expenditure incurred by the province for the acquiring of lands, the erection or improvement of any buildings, or the supplying of furnishings or equipment for any technical education institution established in the province prior to the first day of April, 1919. Then follow the terms and conditions under which the grants shall be made.

Changes in Alberta Mines Act.

Some minor changes were made in the Mines Act of the Province of Alberta at the session which came to a close a short time ago. One amendment provides that the provisions of Section 29 of the Act shall not apply to mines where coal is extracted by the process of removing all the overlying strata. Section 29 deals with the control and supervision of a mine, making it obligatory that its operations shall be under the "control and supervision" of a certified manager and laying down rules and regulations the object of which are to enforce the keeping of underground workings in such condition as will assure their being safe to workmen. Another alteration provides for the semi-monthly payment of wages in coal mines as follows: "Wages earned from the 1st to the 15th day of each month shall be paid on the first Saturday after the 26th day of the same month, and all wages earned from the sixteenth day to the end of the month shall be paid on the first Saturday after the 12th day of the following month; provided that if any of the said Saturdays is

a holiday the wages shall be paid on the Friday before." The power given an employer to retain moneys due for doctor's fee has been repealed. Safety lamps shall be inspected by a person holding a first, second or third class certificate. The two persons appointed by workmen to inspect a mine shall be practical miners.

Granby Wage Increases.

Another advance in the wages of employees of the Granby Consolidated Mining & Smelting Company was announced recently at its smelting centre, Anyox. It amounts to 50 cents a day to miners and 25 cents a day to smeltermen and others, approximately 1,200 men being affected. This is in addition to a 25 cent raise a day for every 2 cents increase in the selling price of copper. Wages have been increased about $1 a day since April 1, when the plant was reopened after being suspended for some thirty days.

Paradise Mine.

A promising body of ore has been developed at the Paradise Mine, on Toby Creek, near Windermere, B.C. During 1917 over 2,000 tons of ore was shipped from this property to the Trail Smeltery, the nature of the ore being a lead carbonate with an approximate content of 30 oz. in silver to the ton and 30 per cent. lead. It is expected that the Paradise will be a steady producer during the present season.

Drilling Placer Ground.

A Keystone drilling machine is to be used in testing certain placer leases situated on Swift River, of the Cariboo District. The work is being undertaken by C. W. Moore, of the Waverly Mining Company. In the early mining days the Chinese sluiced over acres of the territory in question, taking out large amounts of gold. With the crude appliances in use then, however, the surface of the ground only was worked and the promoters of this enterprise are hopeful that the drill will reveal profitable ground at bedrock.

Manganese.

With further reference to the manganese claims situated in the Cowichan District, it is announced that the Tacoma Smeltery of the Burrows Alloys Co. has contracted to take twenty tons of the ore as soon as it can be got out. The ore will be supplied as soon as the road now under construction is completed. If there is a market for manganese at all C. H. Dickie and his associates are confident that the Vancouver Island ore will find a ready sale owing to its exceptional quality.

Fire at "Old Sport" Mine.

Fire broke out at the "Old Sport" Mine, Quatsino Sound, recently and destroyed the compressor house, besides rendering useless the electric light dynamo, the air compressor, and some $5,000 worth of miscellaneous tools and apparatus. The camp, which has been maintained by the Coast Copper Company on behalf of the Consolidated Mining & Smelting Co., has been closed down. It is understood, however, that the plant will be replaced as soon as possible and in the meantime the diamond drilling is to be continued. The "Old Sport" property is considered to be a large copper producing proposition in the making and on the proving of sufficient ore a concentrator is to be installed and a railway built from the mine to the beach. Up to the present the development consists of an adit which crosscuts the ore at a distance of about 400 feet from the surface, a drift along the ore body in each direction for 300 feet, a winze following the dip of the ore for 525 feet, and a drift in each direction at this level for about 300 feet. Besides there has been a great deal of surface work done and considerable drilling.

Dolly Varden.

According to authoritative information, representatives of the Dolly Varden Mining ompany, whose property is situated in the Alice Arm District, intends to appeal to the Dominion Government for the disallowance of the Provincial Legislation which gives the Taylor Engineering Co. power to take over the mine and other of the company's holdings in order to satisfy claims it has presented in respect of the construction of a line of railway from Alice Arm to the mine. It already has been reported that the time given the Dolly Varden Company to meet the financial terms laid down by the Legislature has lapsed and that the Taylor Engineering Company is proceeding to take possession.

District 18 Miners Strike.

The coal miners of District 18 (Eastern B. C. and the Province of Alberta) will strike on Saturday, May 24th, as a result of a disagreement which has arisen in the Crowsnest Pass Section of British Columbia over the pay of some employees who are affected by the Eight Hour Day law. There are about 6,000 men affected by this walk-out, of which number 1,600 are resident in the Crowsnest Pass, and the trouble centres in the wages of some 12 men. The company has conceded that the bulk of the surface workers whose day previously consisted of nine hours shall have the same pay for eight hours, but it refuses the same concession to fan men and others who have been working ten, and eleven hours a day. The Unions have had the matter under consideration for several weeks and, by an overwhelming majority, voted in favor of striking to uphold the claims of the workers instanced for the same daily rate of pay under the Eight Hour Day Act as has been received heretofore. Not only the miners, but all surface workers, including the engineers, have been called out so that the situation to the collieries throughout District 18 threatens to be serious unless some compromise can be reached without much delay. W. H. Armstrong, Director of Coal Mining Operations, is endeavoring to bring about a settlement and it is hoped that his efforts will be successful.

The British Columbia Federation of Labor recently telegraphed the Ottawa Government as follows:

Hon. G. D. Robertson, Minister of Labor, Ottawa:

"Executive of British Columbia Federation of Labor considers refusal of investigation into condition of men who, by Provincial Legislation are working eight hours in coal mines instead of eleven, and as a result have had their wages reduced, is similar in effect to the cause of the Winnipeg strike. Unless something is done for these men the Federation will be compelled to render support in case of strike in the only way possible. Have no desire to see any trouble in the West and consider the only way in which a strike can be averted is by granting an investigation."

NORTHERN ONTARIO.

Matachewan Gold Mines.

According to mining men just returned from Fort Matachewan district, a rich lens of ore has been encountered at a depth of about 80 feet on the Otisse property of the Matachewan Gold Mines. Visible gold, it is said, has been found to occur in spectacular quanties. The outlook for the property appears to be quite encouraging, and, as a result, enthusiasm is growing. The general inclination among property owners is to await further developments, yet there is increasing evidence that a large amount of work will be proceeded with on properites lying close to the Otisse.

The Cyanide Supply.

At the conclusion of his visit to Cobalt, Porcupine, Kirkland Lake and Boston Creek, Mr. Neill, of the Cassel Cyanide Company of Glasgow expressed himself to the Journal as being much impressed with the great headway made during recent years, particularly at the gold mines. Mr. Neill was especially impressed with the efficiency of the mining engineers throughout the district, and appeared to be of the opinion that Northern Ontario was entering into a great period of prosperity.

Concerning the supply and the cost of cyanide, it was pointed out that the supply was now equal to the demand, and that the price had declined more than five per cent., with indications of still further decrease.

Kerr Lake.

A dividend of 25 cents per share will be paid June 16th to shareholders of the Kerr Lake Mining Company, of record June 2nd. This will call for the disbursement of $150,000, and is the second to be made this year. Total dividends paid by the Kerr Lake since the first disbursement on October 4th, 1905, amounts to $8,310,000, inclusive of that just declared.

McKinley-Darragh.

The McKinley-Darragh dividend of 3 per cent. payable July 1st, to shareholders of record June 7th. The disbursement will amount to $67,428, and is the third to be paid so far this year.

The first dividend payment on the McKinley-Darragh was made on March 1st, 1907, since which time a total of $5,551,879, has been paid, amounting to 250 per cent. on the company's issued capital. The company attained the peak of its prosperity in 1913, during which year some 46 per cent. was disbursed in dividends.

The Gillies Limit.

It is learned on good authority that it is quite probable the Ontario government will not open the Gillies Limit for prospecting this year. The government has looked with favor on the suggestion that the Limit be opened this summer, but after making due investigation, feels that it is perhaps only fair that the owners of the Limit should be given the coming winter in order to remove the timber.

The general feeling at the government's probable failure to open the Limit this year will no doubt be one of disappointment, yet mining men and prospectos may reasonably be expected to be among the first to agree that such is the only fair thing for the government to do.

Many returned men are understood to be renewing acquaintances with the Gillies Limit territory, and when the time comes to lift the ban, some of these men will perhaps be in possession of much useful information.

Dome Mines.

The annual meeting of the Dome Mines Company will be held about June 10th. The directors will visit the mine about June 4th or 5th, both in connection with the Dome Extension property as well as the Dome Mines. The favorable developments at the 600-ft. level of the Dome Extension lends considerable weight to the growing belief that the Dome will exercise its opinion on the Dome Extension prior to March of next year. The president of the Dome is expected to make a more or less open statement with regard to the probable trend of developments during the next few months.

$50,000,000 From 50 Acres.

A block of fifty acres of territory lying immediately adjacent to The Square, in Cobalt, has yielded approximately $50,000,000 worth of silver, or an average of about $1,000,000 per acre. There are other sections in the Cobalt camp that can lay claim to a somewhat similar record, yet in no other part of Northern Ontario is there so large a compact block of fifty acres, which has yielded such an aggregate value of precious metal.

The fifty acres referred to is owned in part by the Coniagas and in part by the Nipissing.

McKinley-Darragh.

Despite the fact that the 250-ton oil flotation plant at the McKinley-Darragh has been set in operation at full capacity, and that production during recent months has been considerably higher than during 1918, the company has found it possible to reduce working forces to the extent of about ten per cent.

Arrangements are now being made to explore the south-eastern part of property, which lies adjacent to the Nipissing mine and not far removed from that area where the Nipissing encountered such favorable results in vein No. 109. The McKinley has a small conglomerate area here which has been only partly explored. Several years ago a cross-cut was driven into this area from the 250-ft. level of the main workings, but the work was discontinued before the promising area was thoroughly explored.

Nipissing.

The Nipissing Mining Company has declared a dividend of 5 per cent. together with a bonus of 5 per cent., payable June 21st, to shareholders of record June 30th. The company is capitalized at $6,000,000, and the July disbursement will amount to $600,000.

The Nipissing is the largest dividend payer among the precious metal mines of the Dominion, having paid its first dividend on July 20th, 1906, since which time a total of $19,140,000 has been paid, including that payable in July. The company commenced the current year with ore reserves of 6,000,000, since which time developments have been favorable and point toward the reserve being increased during this year.

Silverton Miners Want Six Hour Day.

At a recent meeting of the Silverton Miners' Union it was decided to endeavor to obtain a six hour shift as a day's work at the rate of pay of $1 an hour.

Miller Independence.

At the 100-ft. level of the Miller Independence Mine at Boston Creek, a rich body of ore has been cross-cut. At the time of writing a width of about sixteen feet has been exposed, with the face of the cross-cut still in ore. Tellurides of gold are said to occur, and while assays have not yet been taken, it is evident the gold content will be high.

The contract for clearing the right of way for an electric power transmission line has been let and the work will be commenced within the week. Transformers placed on order several weeks ago are due for delivery about the middle of June. Several carloads of material and equipment for a big new reduction plant, including a roasting plant, are due for delivery within a reasonably short time and the road from the station is to be improved preparatory to hauling the large amount of material.

Dome Mines.

It is stated, unofficially, that mill heads at the Dome Mines are running as high as $9 to the ton. While it was learned in semi-official circles some time ago that the management intended to treat ore for the time being with an average of about $7 to the ton, it is considered not improbable that a certain amount of $9 ore may be going to the mill.

Hollinger.

Former employees of the Hollinger Mine, who enlisted for overseas service are being given their old positions. Not only this, but they are also being given their promised bonus of 100 shares of Hollinger stock. One of these returned men stated to the writer that the treatment accorded the Hollinger employees, and the working conditions, are of the best, and that every facility was being provided to assist in the efforts of the most ambitious or energetic to get ahead and increase their income.

The minimum wage underground is $4 for eight hours, but where the energetic worker so desires he is permitted to do work by contract and in this way increase his income. In not a few instances, this is being taken advantage of. As in the case of the returned man referred to above, an average of upwards of $5 is being earned for each eight hour day.

Kirkland Lake Miners' Demands.

Under date of May 27th the representatives of the Kirkland Lake branch of the International Mine, Mill and Smelter Workers Union presented a demand to the mine operators of Kirkland Lake, asking for a forty-four hour week instead of forty-eight hours as at present. They also ask for recognition of the Union, for full day's pay on Saturday for four hours work, and a minimum of $4.50 per day for all underground workers. The mine operators are given ten days in which to consider the matter.

The view of the mine operators appears to be that the present high cost of living demands that every workman should be paid as high a wage as is possible, but in view of the heavy economic strain under which gold mines are being operated, it would scarcely be possible to shorten the number of working hours or to increase pay. To this, of course, there may reasonably be found isolated exceptions, but, on the whole, such appears to be the general view.

Teck-Hughes.

According to information from Kirkland Lake, a considerable quantity of high grade ore has been encountered in the Teck-Hughes mine. The new orebody is understood to contain average values well above that of ore heretofore developed.

In view of the fact that the average value of the ore treated during April amounted to $10.46 per ton, the present favorable developments holds out the promise that the average heads may be increased to a point second only to the adjoining Lake Shore mine. While full details as to the extent and average gold content of the new orebody, definite information is lacking, but some of the ore is reported to run as high as $30 to the ton.

CHICAGO MEETING A. I. M. M. E.

Plans for the meeting of the American Institute of Mining and Metallurgical Engineers at Chicago next September are assuming definite form, and the Committee in charge announces the following schedule of events.

On Monday, September 22nd, the opening day, the morning will be devoted to registration of members and guests at the convention headquarters, the Congress Hotel. Monday afternoon the first session for presentation and discussion of technical papers will be held, and in the evening a Smoker, at which the committee guarantees all traces of glaciation will be dissipated.

It is planned on Tuesday to make an excursion in a body, by a boat chartered for the occasion, across the south end of the lake to Gary, for a trip through the famous steel mills. Wednesday will be devoted to technical sessions, morning and afternoon, and in the evening the banquet will be held at the Congress Hotel, at which all members of the Institute and their wives will be the guests of Chicago.

On Thursday, a special train will convey the members and guests to La Salle and Depue, Illinois, where the zinc smelteries, coal mines and cement works will be visited. For those to whom these industrial operations are not of particular interest—this may include many of the ladies—there will be a trip by automobile to Starved Rock and other points of historical interest in the vicinity of La Salle.

For Friday, the 26th, several optional excursions have been planned to local industrial plants. One trip will take in the lead refineries at East Chicago and the Standard Oil Refinery at Whiting. Another excursion will be to Milwaukee, to the plants of the Allis-Chalmers Company and the Power and Mining Machinery Company; this trip will also include the metallurgical works at North Chicago of the Fansteel Products Company where their novel electrothermal processes in the production of metallic tungsten, molybdenum, cerium, and tantalum will be demonstrated.

For those interested in coal mining it is planned to have an excursion to the fields in Franklin and McCoupin Counties, leaving Chicago late Friday evening and spending Saturday at the mines.

Florence Silver.

The retiring board of the Florence Silver Mining Company was re-elected at a recent meeting of the stockholders held in Ainsworth. The board is composed of F. R. Wolfe, president and manager; A. F. Kelly, vice-president; D. E. Saunders, secretary-treasurer; J. A. Lavender and A. M. Frost.

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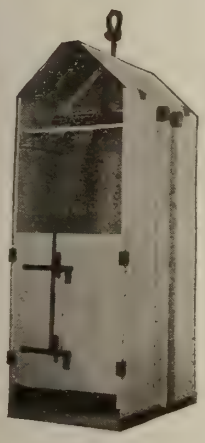

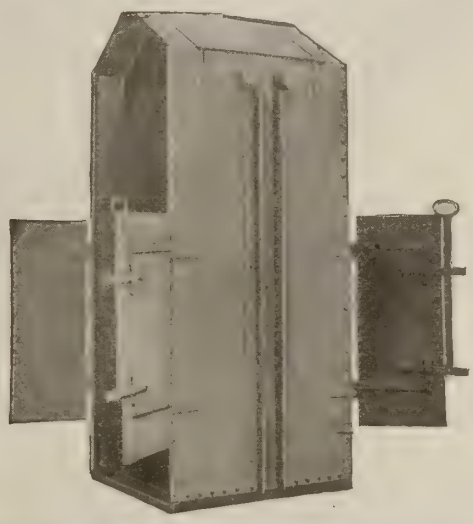

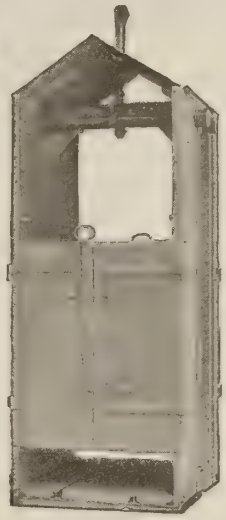

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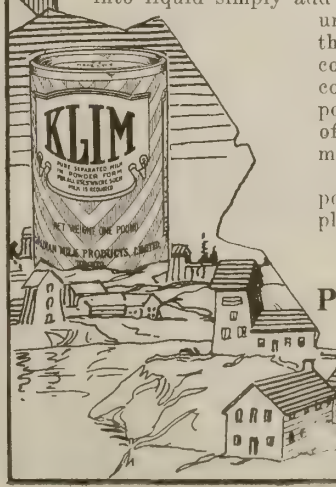

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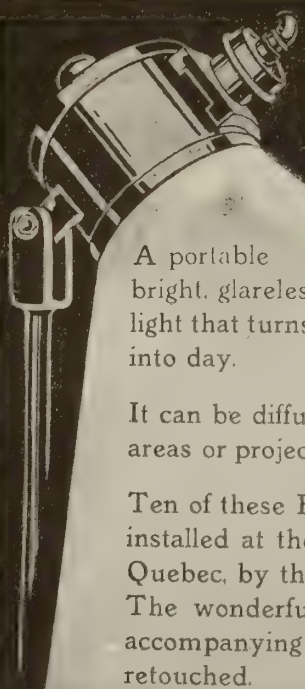

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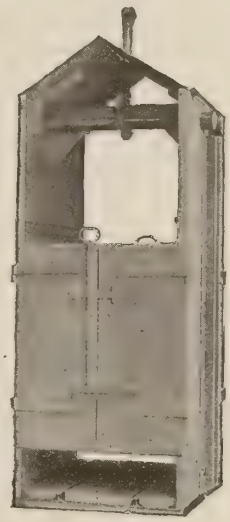

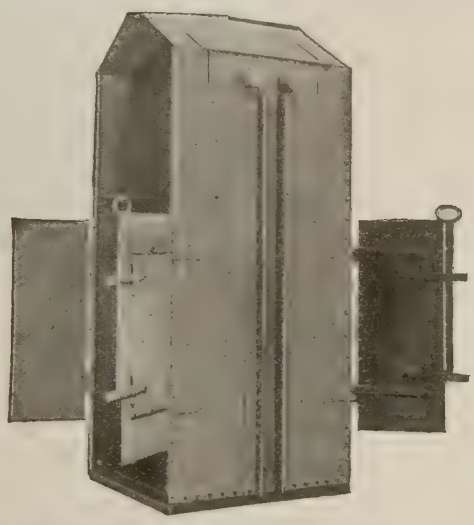

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Mining Corporation.

The Mining Corporation has stopped exploration work on the property acquired some few months ago in the south-eastern part of the township of Bucke. At a depth of about 300 feet some lateral work was done, three veins being cut. In no case, however, did they carry commercial values, with the result that work for the time being at least has been stopped.

The Cowichan Manganese Deposits.

Towards the end of the war announcement was made that a considerable deposit of manganese had been discovered in the Cowichan District, Vancouver Island. The news created much interest in mining circles and also received general attention because of the need of the mineral for munition purposes. Since then a report has been published by G. C. Mackenzie, formerly of the Dominion Geological Survey, on the deposits which speaks highly of the showings, but regrets that more development did not take place between the date of the record and that on which the report was written. Since then C. H. Dickie, one of the owners, who has had some work done, states that some of the ore uncovered certainly contains silver values, but to what extent has not yet been established, the assay returns not having been received. Without question it is a large deposit of ferro-manganese and in this lies its economic value. Enough work has been done with hand steel, he asserts, to prove that the ore carries its high manganese content well below oxidation. Mr. Dickie, with the aid of the Provincial Government, is now preparing to build a road up the mountain side. A satisfactory grade has been obtained, there being a raise of 1,800 feet in a distance of three and one-half miles. Over this road it is proposed to take caterpillar trucks with a trailer to transport the ore to rail. When the property has been further developed and there is more ore in sight the transportation problem should be solved by the installation of an aerial tramway, the conditions for the use of this method being ideal.

THE ROMANCE OF SILVER.

A silent battle is being waged between those who require silver and those who represent the producers. Such is the opinion of interests in close touch with the precious metal situation. The white metal having once more been placed on a solid footing and the price being regulated by the law of supply and demand, the consumer is apparently withholding bids until the last possible moment in an endeavor to induce the producer to throw his product on the market at going prices. Likewise, the producer appears to be waiting competition on the part of those desiring to purchase, with the result that a silent test of endurance, so to speak, is taking place. The present peculiar situation adds still further to "the romance of silver." Like the mystery that surrounds the screen at the close of each episode of serial photoplays so hangs the element of mystery about the white metal. What will be the next move in the quotations for commercial bar silver?

Boston Creek.

One of the most interesting developments in the gold districts is the development of a high grade orebody measuring upwards of sixteen feet in width at the Miller Independence. The ore is exceedingly rich in gold tellurides and has caused much enthusiasm in the Boston Creek district. In a general way, both in the proven gold mining districts and in the prospective field, activity is increasing steadily and the former anticipation of one of the busiest summers on record in this part of Northern Ontario is already being realized.

PERSONALS.

Mr. T. R. Jones, superintendent of the Buffalo Mines, together with his family, are taking up residence in New Wilmington, Pa. Mr. Jones will continue general superintendent of the Buffalo, and will pay a visit to the mine at regular intervals.

Mr. Frank Loring has returned to Toronto after examining properties at Boston Creek.

Mr. W. R. Rogers is at Kirkland Lake, making a topographical map of the area.

Mr. A. G. Burrows and Mr. P. E. Hopkins are making geological examinations at Boston Creek.

Mr. J. B. Tyrrell is at Kirkland Lake.

Mr. Geo. Rogers has returned to Toronto from Wasapika.

Mr. Harwood, who has been recently in Los Angeles, is again at the Schumacher Mine. Mr. Harwood was in charge of the La Rose Mine for several years.

Mr. A. R. Whitman has been examining properties in the West Shining Tree gold area.

Mr. H. C. Crow, President of Cartright Gold Fields, Limited, is leaving the west on a combined business and pleasure trip to England and the Continent. He is being accompanied by Mrs. Crow.

The Carmi Mine.

Seattle and San Francisco interests are said to have an option and bond on the Carmi Lode Mine, Carmi, B.C. A compressor will be installed at once and considerable work done this summer. A new mill may be erected. As the ores of this mines have a copper base the starting of the Greenwood smelter would stimulate the development of the Carmi and other mines of the vicinity.

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:-: EDITORIAL :-:

THE SYMPATHETIC STRIKES.

The sympathetic strikes which we have had recently in various centres in Canada cannot be considered to be remarkably successful from the standpoint of the strike promoters. They have served a useful purpose in directing attention in a forceful way to the widespread discontent caused by the high cost of living. They have at the same time demonstrated that the general public will not submit to the dictatorship of radicals who would turn government upside down if they had their way.

Strikes have their place in the industrial world. If it were not that they are so often accompanied by unnecessary violence and destruction of property we would welcome them occasionally, for they often bring discontent to the surface and lead to desirable improvements in conditions. Strikes are undoubtedly Labor's most powerful weapons and no class need ask that Labor be deprived of its weapons so long as they are used in fighting for a good cause. We would protest against the sympathetic strike because it is obviously a misuse of weapons, an attempt to gain selfish objects by imposing indiscriminate hardships on the rest of the community. We do not wonder therefore at the reception given to these strikes in Canada. The recent action of the Metal Trades Council in advising sympathetic strikers in Toronto to return to work is a sign that the strikers themselves are not overly enthusiastic.

WAGES AND HOURS.

Miners at Kirkland Lake and Cobalt are making demands on their employers for higher wages and shorter hours. These are matters that should naturally be adjusted by arbitration between employers and employees. There are two sides to the question.

The miners are doubtless aware that conditions at present in Ontario gold and silver camps are much brighter than in many mining districts in North America. They will do well to consider whether they should not do their best to hold the jobs they have. If they make unreasonable demands they may so change conditions that there will be few opportunities for profitable employment. Gold must be sold at the standard price regardless of cost of production and where the margin is small the sure result of increase in cost is obvious. Moreover, there must be a very considerable profit on operations in order merely to return capital invested and a moderate amount for the use of the money.

The profitable mine must in addition return a considerable amount to bear the cost of exploring and developing other properties, many of which prove to be "lemons." The profitable companies pay directly for only a very small part of the cost of searching for and developing the other properties; but indirectly they must pay if the industry is to grow as it has in the past. In the hope of developing a very profitable mine, men spend money in very considerable amounts on promising properties. They lose more often than they win. They would surely not continue if there were no hope of large profits. There would then be no new mines developed and the miner would be in little demand. It is obvious that the miner profits more surely than does anyone else as the industry develops. It is up to him therefore to take care that his demands be not unreasonable. He should demand a fair share in the profits of the industry; but so long as others bear the cost of all the unprofitable ventures he should not be disgruntled if a few of these ventures-some ones are successful. In fact, he would have more occasion for discontent if there were no prizes to lure the adventurer into new fields.

The miner may reasonably demand good wages and an eight hour day. He should also have the Saturday half holiday if he wants it and is willing to give something for it. The actual wage must be determined by conditions that are partly local and partly general; but in our opinion general increase in wages at present would give no permanently good result. What is more needed is co-operation between employers and employees to fight the increasing cost of living. Advance in wages may be necessary to relieve the situation temporarily. In fairness to the miner the wages must keep pace with increased costs. It is not surprising that the miner desires to get a lap ahead in the race, but that is not sufficient excuse for keeping him a lap behind.

We have no sympathy with the idea that industry should not be carried on for profit; but if it were, it would be found that there is no great profit in the mining industry at present. There are notable successes which obtain much publicity, and there are countless failures in which the public takes little interest. If the miners owned all the prospects and mines and worked them on a mutual profit sharing plan, they would find that their present wages would appear much larger than when they compare them with the profits of a few successful companies.

The miners can fairly demand that they should receive for their labor, wages that will enable them to bring up their families in reasonable comfort and provide their children with such education as will make them good and useful citizens. If the present wages are insufficient to give labor reasonable cause for satisfaction, demand for increase is a natural consequence. It then remains to be determined whether the industry can stand the increase. There is no doubt that a few mines could be operated at a profit even if wages were much higher; but the answer to the general question is not so simple. We shall be disappointed if it is found that the industry cannot flourish while enabling the miner to earn a decent living.

WORKING HOURS IN NOVA SCOTIAN COLLIERIES.

Before the Royal Commission on Industrial Relations which completed its tour of Canada by a recent sitting in Sydney, C.B., the President of the United Mine Workers in Nova Scotia outlined to the Commission the decision of the miners to obtain a five days week with eight hours daily work, and announced that "ultimately they hoped to get a six hour day and a substantial increase in wages." This system the Local President of the U. M. W. of America thought "would act as a cure for unemployment as a large number of men not now at work would be absorbed."

We have every sympathy with the desire of miners to ameliorate their living and working conditions, but surely the responsible leaders of men do not believe their employment can be increased by decreasing working hours and increasing wages, or, in other words, by the process of adding to the cost of coal to the consumer? The reason for any lack of employment in Nova Scotian collieries at the present time lies in the high cost of coal production there, and the consequent limitation of the radius in which Nova Scotian coal can find a market. There is really no overproduction of coal anywhere to-day. Over-riding everything, and only temporarily obscured by the unrepresentative conditions of the coal market that momentarily exist, is a world shortage of coal. The only place where there is no local shortage is North America, and probably nowhere in the world can coal be mined so cheaply and in such abundance to-day as in the United States.

The amount of employment available at Nova Scotian collieries is decided by the competitive prices of United States coal in Canadian markets. If Nova Scotian coal is now unsaleable at a profit in Montreal, how will much shorter hours and a substantial increase in wages provide additional employment?

Over eighty per cent of the coal now mined in Cape Breton comes from undersea areas. What would a six hour day mean in a submarine colliery? Possibly not more than four hours work at the coal-face. How could coal be produced and sold at a profit from submarine collieries under such conditions?

Further, it should be noted, that coal lies at the base of our industrial structure, and that every manufacturing process and all transportation charges must bear the burden of increased coal-selling prices. It would be interesting to know just how much of the increased cost of living is directly and indirectly attributable to the increase in the price of coal to the consumer. We suspect the bulk of it is so attributable, and if the coal miner insists upon demanding preferential treatment in his work, and hours of work and wages which are out of proportion with those of his fellow-unionists it must inevitably result in lessened employment and increased living costs for everybody.

The maintenance of a gold standard of currency and coal production are very closely inter-related, so inter-related in fact that every increase in the cost of coal to the public is equivalent to a depreciation of the currency value, and it is perhaps time that we should stop talking of the high cost of living and should discuss the depreciation of the dollar. It may be demurred that coal is not any more basic than other essential commodities, such as wheat and food stuffs generally, and from the standpoint of physical existence that is correct. From the standpoint, however, of monetary values, there is nothing to-day that is so fundamental as coal selling-prices, and that is why the wages and hours of labor of coal miners are of greater importance and of wider effect than might be inferred from a comparison of the number of men engaged in coal mining with those engaged in all other industrial pursuits.

EXPLOSION OF BLACK POWDER IN THE BALTIMORE MINE OF THE DELAWARE & HUDSON AT WILKESBARRE.

The newspapers record the death of 83 men and the serious injury of 50 others by burning and violence through the explosion of seven kegs of black powder in the Baltimore Tunnel of the Delaware & Hudson at Wilkesbarre. The powder was being conveyed into the mine in the same trip that carried men to their work by means of an electric trolley road. The accident is, so far as we know, a unique one. Newspapers accounts of mine accident are not always to be wholly relied upon, but the combination of a workmen's train a large quantity of black powder, and a bare overhead electric trolley-wire, is one that is not conceivable in a coal mine operated under the regulations of most civilized countries.

The use of black powder in a coal mine is in itself scarcely excusable, and it is surprising that the practice should still be permitted. The advantages of black powder, and it has some advantages, do not out-

weigh its danger. The use of overhead trolley systems in collieries in the United States has always been a source of astonishment to British mining engineers, although their convenience and economy are very great. The conveyance of black powder in a workmen's train was not only inexcusable but unnecessary. Explosives cannot be carried on ordinary passenger railways, but the conditions of confinement in a colliery tunnel would cause a much greater potential danger than any conceivable conditions above-ground.

Collieries will never become comparatively safe places — they can never be entirely safe — until naked lights of all descriptions are prohibited. Naked lights may be considered to include any sparking or danger of sparking of electric appliances, the use of any form of blasting except "permitted" powders and electric detonators, and, of course, the use of all open lights such as acetylene torches and unenclosed oil lamps.

We shall await with interest the comment of United States coal journals on this disaster, and the more exact details which will be presented at the enquiry.

SUBMARINE COAL LEASE QUESTION IN NOVA SCOTIA.

Text of Recent Act.

The Legislature of Nova Scotia, during the session recently prorogued, passed an act "to legalize and validate an Order-in-Council respecting a Certain Coal Area in Cape Breton," which conveys to the Nova Scotia Steel & Coal Company the right to enter upon the leased areas of the Dominion Coal Company abutting upon the north side of the area leased by the Scotia Company and forming the territory tributary to the workings of the Florence Colliery. The permission given is limited to a distance of one thousand feet in width by approximately 5,000 feet in length, and has the effect of increasing the area tributary to the Florence Slope by a parallelogram of that extent.

Compensation to the Dominion Coal Company is to be paid under the arbitration clause of Chapter 16 of the Acts of 1918, and such compensation will be in addition to the usual royalty of 12½ cents per ton on the coal mined and sold from the transferred area, which the Scotia Company will pay to the Government.

The validation of this Order-in-Council was regarded by the Nova Scotia Government as merely a measure of temporary relief to the working conditions of the Florence Colliery, and at the recent session of the Legislature an act was passed giving to the Government general powers to deal with the submarine coal tracts so as to assure as far as possible that these tracts shall be worked most advantageously and in the best interests of the Province. The text of the Act is as follows:

1.—The Governor-in-Council may whenever he deems it expedient appoint two or more persons, of whom the Commissioner of Public Works and Mines may be one to be commissioners to inquire into and concerning whether any worked or unworked submarine coal mining area now held under lease and subject to the provisions of the Mines Act, can, if unworked by advantageously worked or if worked be more advantageously worked in the best interests of the Province by some other leasee of coal mining areas that are subject to the provisions of the "Mines Act," and to report thereon to the Governor-in-Council with any recommendation such commissioners may think fit.

2.—For the purpose of any inquiry such Commissioners shall have all the powers, privileges, authorities and immunities of a Commissioner appointed under "The Public Inquiries Act" passed at the present session of the Legislature.

3.—Notwithstanding any of the provisions of any act of the legislature of Nova Scotia and notwithstanding any lease of coal mining areas heretofore or hereafter issued under authority of an Act of the Legislature of Nova Scotia, the Governor-in-Council on the report of such Commissioners is authorized and empowered to make such orders and regulations as he may deem expedient for the purpose of ensuring that such submarine coal mining area shall be worked in the best interests of the Province, and for greater certainty but not so as to restrict the generality of the foregoing terms of this section it is hereby declared that the Governor-in-Council may by Order-in-Council, vest in any leasee of any coal mining area that is subject to the provisions of the "Mines Act" any submarine coal mining area that is so subject and is held by any other person as lessee.

4.—When any such area is vested, as aforesaid, the person in whom the same is so vested shall hold the same subject to the same terms and conditions and covenants upon which it was held immediately before being so vested and on such other terms and conditions as the Governor-in-Council deems expedient.

5.—Compensation shall be made by the person in whom such areas are so vested to the person so divested of such areas and the same shall be determined by the Governor-in-Council and may be according to such method and on such basis as he deems expedient and without restricting the generality of the foregoing such method and basis may be in one or more of the following ways or partly in one way and partly in another, namely:

(a) vesting as aforesaid of areas in one person in satisfaction in whole or in part of those vested as aforesaid in another person:
(b) a payment of a fixed sum in cash or in instalments; two hundred and forty pounds of coal which may be mined from the area so vested;
(c) a payment or royalty per ton of two thousand and two hundred and forty pounds of coal which may be mined from the area so vested;

6.—The compensation for any area so vested shall stand in the stead of such area so vested, and any claim to or encumbrance thereon shall as respects the person in whom the area is so vested be converted into a claim to or upon compensation and shall no longer affect such area; provided that where such compensation is wholly or in part in cash the same may be paid to the Prothonotary of the Supreme Court at Halifax, and the same may be paid out to the person or persons entitled thereto on application to a Judge of the Supreme Court who may make such orders and direct such notice to be given as he deems necessary to protect all persons interested in the cash paid to the Prothonotary as aforesaid.

7.—This Act shall not apply to any submarine coal mining areas now held under lease dated 1st day of April, 1893, entitled "An Act for the further encouragement of coal mining."

The Act, which was brought down as a Government measure, was moved by the Hon. Commissioner of Mines, Mr. E. H. Armstrong, in an exhaustive speech of some three hours in duration which showed that the Commissioner had devoted to one of the most important matters that ever come before the Nova Scotia Legislature the attention and research that the delicate and involved question of the undersea coal leases deserves.

A perusal of the Act will show that it is not a confiscatory or extremely radical measure, and that it aims only to empower the Government of Nova Scotia to transfer the right to mine coal from undersea leased areas upon payment of proper compensation.

Clause 7 of the Act excepts from the provisions of the Act the so-called "blanket lease" of the Dominion Coal Company, which is a lease of the various properties consolidated and incorporated into the Dominion Coal Company's areas at the time of the formation of the Company in 1893. This lease contains special covenants inhibiting the Legislature of Nova Scotia from enacting future laws that would lessen the value of the properties contained in the "blanket lease."

It is of course, well known that the action of the Government arises out of the undersea areas question as it affects the Dominion and Scotia Companies, and it has been publicly announced by the Commissioner of Mines that the appointment of a Commission under the powers conveyed by the Act will not be made until it shall have proved impossible to arrange an adjustment of the undersea areas by private negotiation between the two companies concerned. It is understood that, at the request of the Nova Scotia Government, committees from the Boards of Directors of the Dominion and Scotia Companies have already been in conference with this object in view, but so far no information has been given to the public by either company as to the progress of the negotiations. —F. W. G.

REPRESENTATIONS OF THE NOVA SCOTIA STEEL COMPANY

In Connection With the Extraction of Coal From Under-sea Areas:

The technical side of the representations made by the Nova Scotia Steel & Coal Company in connection with the extraction of coal from the undersea coal tract off Sydney Harbour is contained in the following excerpts from a letter addressed to the Commissioner of Mines of Nova Scotia. After referring to the manner in which its collieries are specifically affected, the Scotia Company states:

"Without attempting to detail all the present and future hindrances to the successful extraction of coal brought about by the two companies owning leases which interfere with each other's mining operations, we believe the situation may be summarized by stating that the configuration of the mining areas as defined by the present lease line imposes upon the always difficult engineering problem of successfully mining coal from seams underlying the sea unnecessary and additional hardships, both in regard to the physical difficulties of approach and extraction, and the cost of mining.

The consequences of the existing situation are, and will be, in part as follows:

Duplication of Expenditure and Waste of Effort.

If the Nova Scotia Steel & Coal Company, for example, should decide to win coal from the leases it holds off Lingan Head; or if, conversely, the Dominion Coal Company should extend its operations to the Sydney Mines side, it will necessitate a duplicate expenditure in railways, shipping piers, colliery equipment, shaft-sinking, and other outlays inseparable from the development of collieries, of an entirely additional and completely unnecessary character.

There will also be other expenditures of a municipal character, such as accompany the development of a community, including water-supply, houses, streets and schools. The major portion of these expenditures will fall upon the operators, who will, of course, be the largest ratepayers.

There is no manner in which these unnecessary and duplicate expenditures can be recouped except through the selling price of coal, and eventually, the public will pay for a proceeding that is inadvisable in every interest as well as unnecessary.

The coal companies are also the largest ratepayers in the existing municipalities, or in other words, they are the largest shareholders in the existing municipal investments.

As the existing municipalities decline, therefore, so will the bulk of the liabilities fall upon the coal companies, who will at one and the same time be required to support declining municipal finances, and also to bear the brunt of new and unnecessary outlays for the creation of mining communities, which can only have an ephemeral existence, because they will be brought about by the attempt to build upon the essentially unsound basis of duplicate exploitation of the coalfield inseparable from a perpetuation of the existing arrangement of leases.

Increased Costs of Mining.

Apart from the permanent burden on the cost of mining coal which would be occasioned by the duplicate expenditure just mentioned, any attempt to mine coal in conformity with the existing lease lines must heavily increase the cost of mining the undersea coal-seams. The conditions imposed by the intervention of leases held by other than the operating company prevent the projection of future workings under the sea in the manner and in the order that ordinary mining practice would direct.

Anything that increases the difficulty of mining coal also increases the cost.

Limitation of the Life of the Submarine Coalfield.

The point where the extraction of coal from under the sea will become impossible by reason of physical limitations is unknown. There is, however, another limitation to undersea coal-mining, that of cost, and it is self-evident that this limitation by cost will be reached at an earlier date by a retention of the difficult conditions of mining occasioned by the lease lines than it will be if mining is carried on in a natural way.

You are without doubt aware how great is the proportion of the coal reserves of Nova Scotia that is contained in the undersea areas. It is most desirable that the maximum yield should be obtained from the sub-

marine tracts, and it is apparent that the more natural, and in consequence the less costly is the method of mining used, the greater will be the income which the undersea coal will yield in royalties.

In other words, the amount of coal recoverable from the undersea coalfield will be decided by the costs of mining, and anything that tends to increase these costs will lessen the amount of coal profitably recoverable.

An Endangering of the Accessibility of the Remoter Undersea Coal.

In those cases where the leases of undersea areas cover territory adjacent to the shore, but do not permit of access to leases held by the same operator lying further out to sea because of the intervention of the holdings of another lessee, it is to be expected that when the immediately available territory is exhausted, except as regards the coal left standing in pillars, that these pillars will be drawn in retreating order commencing at the deepest extension of the pillar workings, which will thereby cut off the access to the outlying coal, and render the extraction of the remoter coal difficult, if not entirely impossible, because of physical problems, and certainly quite impossible as a commercial enterprise.

The foregoing conclusions do not exhaust by any means the possibilities of serious damage to the future of the submarine coalfield, but we believe they are sufficient to indicate to you how real and pressing is the danger."

In confirmation of its statements, the letter of the Scotia Company quotes extracts from a report made in 1877 by the late Dr. Henry S. Poole, at that time Chief Inspector of Mines for Nova Scotia, a document which the "Journal" believes is of sufficient present interest to justify its reproduction in the next issue. The gist of Dr. Poole's recommendations is contained in his statement that "instead of allowing distinct individuals to take out leases of areas, one beyond the other, it would undoubtedly have been better and more conducive to the interests of the country to have restricted each lease to a certain frontage on the adjoining coast."

NORTHERN MANITOBA MINING CO.

The Northern Manitoba Mining Company, with a capital of one million, divided into one milling shares of one dollar each, is a local enterprise, almost entirely officered and financed by Pas people. The company's property comprises three gold claims situated at Herb Lake. Machinery to the value of $12,000 has been installed, consisting of a 40 h.p. boiler, two drills and compressor, with blacksmith shop, and several buildings. A shaft was sunk to a depth of 120 feet, and the values, it is sttaed, held all the way down. Last spring a carload of ore was sent to Trail, and the smelter returns gave $81 a ton. The mine operated for a short time only, when, on account of the lack of funds, it closed down.

The president of the company is Mr. H. S. Johnson, manager of the Armstrong Trading Company, and the secretary is Mr. R. Kerr.—The Pas Herald.

WEST SHINING TREE.

The Foisey claims at West Shining Tree have just been placed under option to the E. J. Longyear Co. of Sudbury, Ont., and Minneapolis, Minn. The Millar-Adair, north of the Foisey, has been purchased by Isbell, Plant and Co. The Wasapika gold mine adjoins the latter further north, and all these properties are on the great Ribble vein.

THE ABSORPTION OF SILVER BY INDIA.

A writer in the Boston News Bureau says:

As the Orient was willing to accept silver in place of gold or commodities furnished the Allies during the war, it was to the interest of the United States and the allies that foreign trade balances should, as far as possible, be settled in silver rather than in gold. It was better, also, than by stabilizing exchange or raising-credits. The latter expedients only defer the final settlement in gold. The settlement of the Oriental balances in silver during the war represented a definite settlement, calling for no future adjustment.

Normally, India had an adverse trade balance of about $90,000,000 before the war, but by the end of 1917 the balance is said to have grown to nearly $400,000,000 in her favor. London could not satisfy this Indian demand and so Lord Reading was sent over here in 1917 to induce the United States government to come to the aid of Great Britain with our store of silver dollars, the only supply in the world left available.

According to official figures, India has absorbed, since April 1913, 1,200,000,000 silver rupees, about 404,166,000 ounces, or roughly, $400,000,000.

How seriously the situation is viewed in Britain is gathered from the following remarks delivered recently by Sir James Meston, the financial member of the Indian government, in his budget speech:

"Few would suspect the forbidding portals of the finance department of harboring a romance, and yet the whole story of how Sir William Meyer and his trusty henchmen held the gate against inconvertibility and its attendant woes, and of how our old friend Sir James Brunyate fought our battle simultaneously in Washington—the whole story is as good as any romance to those who, like myself, were anxiously awaiting the situation from London. It seemed from week to week an utter impossibility that the government of India could possibly escape from the suspension of specie payments, and yet the feat was accomplished, and India owes no inconsiderable debt of gratitude to those whose skill and tenacity averted the misfortune.

"The crisis, however, has a lesson and that lesson is that we are on permanently unsafe ground until India is educated up to abandoning its habit of hoarding money in unsettled times. India's reputation as the sink of the precious metals is an unhappy one, and we all trust that in time she will outlive it. Meanwhile, government cannot possibly go on meeting the insane demand for silver rupees, which disappear from circulation as soon as they are minted, without serious effects on the world price of silver, already far too high for comfort. There is absolutely no justification for the continuing panic which has drawn 1,200,000,000 silver rupees from our mints during the last four years, and unless it is checked and the hoarded coins restored to circulation we may be forced to reconsider the whole basis of our currency and exchange policy."

When the Federal Reserve Board removed the ban on silver exports, the action was accepted everywhere as heralding the beginning of a new era in silver. "Silver has come into its own," people said. "India needs silver, China needs silver, the world needs silver. Europe must have silver to fortify its paper inflated currency. There cannot be other than a soaring market for silver."

Such were the optimistic beliefs expressed generally, excepting in bullion circles. There, experts know, what most people overlook, that silver is a commodity, the

market for which, like few others, is subject to government necessities. In the absence of any definite knowledge as to future government demands, dealers refused to share in extravagant predictions as to how high silver is apt to go with the export ban lifted.

Seventy-five per cent of the annual silver production has been going to India—the Sink, as it is called; for there it stays and disappears from view. As one silver authority put it, "It is the market for the other 25 per cent production that is expected to govern the price of the whole 100 per cent. If you will tell me what the Indian government is going to do about silver now, I could give you some idea of where the price of silver is going."

India has always been the enigma of silver. But is more than ever so today. It is impossible to get bullion dealers to prognosticate. They deal in only a small proportion of a market—the greater part being at the uncertain disposition of the Indian government; for you cannot ship silver into India without the authority of the Indian government.

"When people tell you," said this silver authority, "that silver is bound to go sky high under present conditions, it is fair to ask them whether regarding that 25 per cent of open supply, or that 75 per cent of India's usual quota. And you will not find anyone who is able to tell you definitely what India is going to do about silver.

"India's absorption of silver is as much a matter of fancy as of trade. It is much easier to gauge the price of a commodity, like wheat, because there we have something that represents a definite human demand.

"As the Indian demand for silver has been most intense for the past two or three years, I think my guess as good as anybody's when I say that if there is to be any change at all in the Indian silver demand, it will be lessened."

If this expert's opinion proves to be the case, the silver outlook would be complicated by the fact that, other things being equal, more than the usual 25 per cent of the production may find its way onto the market.

WASAPIKA GOLD.

Toronto, June 6.

Developments at the Wasapika are stated to be shaping up in a highly favorable manner since aggressive work was resumed early in the year. Manager Geo. R. Rogers, who left for the property last night, stated that the shaft, which has been sunk west of the Ribble vein, has reached a depth of about eighty-five feet and that the showings in the bottom are very encouraging.

While the shaft was sunk some eighty feet away from the vein, it has been proven that gold values permeate the rock over the full width between the shaft and the vein, indicating a very extensive ore body.

It is planned to continue the sinking of the shaft at the Wasapika till the 100-foot level is reached. At this point a station will be cut and a cross-cut run to test out the vein at this depth. The shaft will then be continued down to 200 feet.

The deepest shaft at Kalgoorlie, Western Australia, is at the Ivanhoe mine, which is bottomed at 3,620 ft. Reserves are 1,000,209 tons of $8.16 ore.—Mining & Scientific Press.

INTERNATIONAL NICKEL.

In his remarks accompanying the annual report, President Bostwick, of International Nickel Co., says it is futile to attempt to forecast conditions that will obtain throughout the current fiscal year.

"There are certain important factors in the consuming markets, both here and abroad," he says, "that must be reckoned with that are temporarily adverse in character, such as the hesitant condition of industry generally, until the definite consummation of the peace treaty; the presence of large stocks of metal and scrap metal, both in governmental and private possession; the embargoes against imports in foreign countries, the difficulties of financing and exchanging in the foreign markets and the possibilities of some restrictive measures as to armaments or trading freely in raw materials being incorporated in the peace treaty.

"On the other hand the company's plants, mines and ore reserves are in splendid physical condition, and there has been provided a capacity badly needed by the company to enable it to advance the uses of its various specialty nickel and Monel metal products for commercial uses. Moreover, with increasing growth in the use of alloy steel an increased consumption in that quarter can be looked for."

Mr. Bostwick says in the first eight months of the fiscal year, up to the signing of the armistice, the company's operations were conducted at full capacity and under the greatest possible pressure for maximum production. The completion of the Port Colborne refinery and the Copper Cliff smelter permitted the company's output to keep pace with the constant increase in the demand for nickel from allied governments. Almost the entire production was used for government purposes and little was available for ordinary commercial lines.

Following the armistice the demand from the various governments was greatly curtailed and this required a rapid adjustment of output. At the close of the fiscal year, March 31, plants were operating about one-third of capacity.—Boston News Bureau.

At the annual meeting of the stockholders of the International Nickel Co., at Bayonne, N.J., the retiring directors were re-elected.

The board met and organized by re-lecting the officers. No successor was chosen for the vacancy created by the death of the late Captain J. R. Delamar.

In a recent issue the depth of the Ooregum mine, on the Kolar goldfield, in India, was given as 5,380 feet. A later report, just to hand, states that two shafts, the Oakley and Bullen, have reached the 60th level, which is $5,419 feet vertically below the surface. The Ooregum exploits an ore-shoot, or series of nearly parallel ore-shoots, on its pitch northward from the Mysore and Champion Reef mines. These properties, so successfully managed by the old and honorable engineering firm of John Taylor & Sons, have been highly productive since 1883. They were first explored by white men in 1871, when an Irish soldier, named Lavelle, began to prospect on the site of ancient workings, which were 300 feet deep in places, notably on the Mysore ground. Last year this group of four companies, all under the same capable management, produced $10,029,000 worth of gold.—Mining & Scientific Press.

Mines Are Not All Profitable

Ninety Per Cent. of Earnings in Successful Northern Ontario Mines are Paid Out in Wages and Materials.

By J. A. McRAE.

In those days of reconstruction, when the nationalization of certain of the industries of the nation are moot questions, it is interesting and may possibly be instructive, to review the position of the precious metal mines. In a sense, the statement that the cost of producing gold ranges between $30 and $40 per ounce may sound ridiculous when it is considered that gold has a standard value of but $20.67 per ounce. The fact is that where one gold mine is brought to a point of profitable production there are scores of mines that do not share so desirable a fate, with the result that nearly twice as much money is spent on gold mines than the value of the total output.

Any one familiar with the mining industry of Northern Ontario and the large amount of capital being spent annually on the mines can clearly realize that during 1918, when only three gold mines and but ten silver mines paid dividends amounting to an aggregate of $6,819,880, the interest return on the capital involved must be lower than the interest return on the capital invested in any other industry. Indeed, were it not for the fascination of mining, presenting as it does opportunity for large reward to the successful, the business of mining would not be the important national asset that it is to-day. While it would be comparatively easy for an organization or a government to subsidize the existing profit yielding mines and realize a profit for the benefit of the state, yet it is a fact that such a condition would cease with the working out of the present mines, for the reason that the cost of prospecting, exploring and developing new mines would be greater (as shown by facts of history) than the value of the precious metal produced. In a word, the nationalization or the subsidization of the precious metal mining industry does not appear feasible, and if the industry is to flourish, as there is every indication that it will, then the mining of silver and of gold must be left to private or individual effort.

In connection with the silver produced in Cobalt, statements have been made that the mining companies get $9,000 out of every $10,000 produced. While to mining men such a statement is known to be utterly erroneous, yet among those not altogether familiar with the facts, reference is often made to such "an unfair division of the result of man's labors." Therefore, in order to prevent the spread of such absurd stories, it might be well to present the facts, which are these:—

In the year 1918, which was the second best year in point of value of production in the history of Cobalt, the mines of the camp produced a total of $17,290,826, of which $4,948,348 was paid in dividends, the balance of $12,342,478 being absorbed in costs of labor and supplies. During the same year the gold mines produced $8,567,178, out of which $1,871,542 was paid in dividends, leaving a balance of $6,695,636 to defray the cost of labor and supplies.

The total output, therefore, of the silver and gold mines was $25,858,004, of which a total of $6,819,890 was paid in dividends, as against a cost of $19,038,114 for labor and supplies. In dealing with these figures it is well to remember that the dividends paid, as above shown, represent the return on thirteen companies having an aggregate capital of $67,050,000, and that the interest on this capital amounted to about ten per cent. So much for the successful mines. But, where one mine makes good there are generally scores of failures. Northern Ontario is no exception, and while $25,858,004 was being produced in 1918, and while the disbursement of $6,819,890 was being made on the involved capital of $67,050,000, the unsuccessful mining company were spending sums of money in an effort to make good, this expenditure unquestionably exceeding the profit derived from the successful mines.

Then, too, who are the recipients of the dividends paid? To this there is but one answer: The shareholders of the stock companies operating the mines. At this point another interesting condition arises. The shares of these companies are held by scores of thousands of men and women. Among them are a large number of the mine workers of Northern Ontario. Indeed it would probably be a revelation to know the large total in dividends being collected annually by wage earners in this country and the United States who are shareholders in the mining companies.

With regard to the statistics to which reference has been made in this article, the following figures are presented, which show a complete list of the mining companies in Northern Ontario which paid dividends during 1918, showing the capitalization of each company, and the amount disbursed in dividends. The scores of non-dividend-paying mines are not shown for the reason that they are so numerous and could not be included in any alleged unfair division of wealth, unless it should be that the shareholders might complain against unfair cost of labor and supplies as compared with the value produced:

Company.	Product.	Capital.	Divids. paid in 1918.
Buffalo	(silver)	$ 750,000	$ 250,000
Coniagas	(silver)	4,000,000	500,000
Hollinger	(gold)	25,000,000	1,230,000
Kerr Lake	(silver)	3,000,000	600,000
La Rose	(silver)	7,500,000	30,000
Lake Shore	(gold)	2,000,000	100,000
Mining Corp.	(silver)	8,300,250	1,380,751
McIntyre	(gold)	4,000,000	541,542
McKinley-Darragh	(silver)	2,000,000	269,712
Nipissing	(silver)	6,000,000	1,800,000
Penn-Canadian	(silver)	1,500,000	40,491
Seneca-Superior	(silver)	500,000	2,394
Temiskaming	(silver)	2,500,000	75,000
Totals		$67,050,250	$6,819,890

NORTHERN ONTARIO.

Since the resumption of work early in the year at the Tough-Oakes Mine, development work has added greatly to ore reserves. It is understood from six to eight months ore is now in sight as compared with practically no reserve at the time of closing down last summer.

The mill has not yet been set in operation, it being the intention of the management to concentrate effort toward development work until such time as there can be no likelihood of running out of ore during any period in which development work failed to add to reserves. According to late advice from the mine, a new vein has been encountered in a cross-cut on the Burnside property, which is to be concluded in a merger with the Tough-Oakes. This vein was discovered during the course of connecting the underground workings of the two properties. The consolidated properties bid fair to soon be producing gold at a rate equal or perhaps in excess of the banner days of the Tough-Oakes before the shortage of labor and high cost of supplies caused the big slump in gold mining during the closing months of 1917 and the whole of 1918. Prior to that time the Tough-Oakes was producing as high as $60,000 per month.

Percy Hopkins and A. G. Burrows, members of the permanent staff of geologists of the Ontario Bureau of Mines, are in the Boston Creek field making a study of conditions there. The amount of work done in the district since the last government report was issued a few years ago makes it possible to prepare a more detailed may and should convey a better idea to the mining public of the big potentialities of the new camp.

The gold tellurides which occur on the Miller Independence are being tested.

An encouraging discovery of gold has been made on the Wickstead property, situated a short distance to the east of Bourke's siding, according to reports just brought out by prospectors.

The case involving a strip of territory lying along the boundary between the O'Brien Mine and the Violet property of the La Rose Mining Company has been concluded, judgment being reserved.

A good deal of work was done on the Violet by the La Rose prior to the time of the dispute concerning the correct location of the boundary. The main shaft, as well as a part of the mine buildings are located on the strip of territory involved.

Among some of those who heard a good deal of the evidence presented at the hearing, the opinion appears to exist that no matter what the decision may be, an appeal to another court is not improbable.

The Sullivan property, situated in the township of Maisonville, near Sesekinika, is to be diamond drilled this summer, according to word just received. The property received a good deal of attention several years ago owing to the discovery of a narrow vein being opened up with spectacular showings of gold.

The return of interest to this area is the logical result of increasing interest in gold mining after the war.

A diamond-drill hole put down near the north boundary of the Miller Independence Mine has penetrated an ore body about sixteen feet in width at a depth of 103 feet. The hole was put down by the company owning the adjoining property to the north, it being planned that the drill would pass onto the Cullen-Renaud property at some little depth. Permission had been granted allowing the machine to be set up on the Independence. The ore body, although encountered near the north boundary of the latter company's property is dipping at an angle of about fifty degrees to the south and is considered to be of very considerable importance to the Miller Independence.

According to information just to hand, not only is it proposed to operate the old Keeley Mine in South Lorrain in an aggressive way, but the controlling interests also are evincing a desire to secure additional property in that district.

During the exploration and development work carried on several years ago in the South Lorrain area, quite a number of large veins containing a good deal of cobalt, with low silver values were opened up. While these veins at that time were of questionable commercial value, it is thought the present higher value of silver might reasonably make them worth mining. And, as a consequence, mining interests are taking new interest in the field.

Dr. Merchant, superintendent of Technical Education in Ontario has concluded a visit to the Haileybury Mining School. Mr. McLaughlin, assistant director of Technical Education also paid a visit to the school.

Arrangements are being made to hold the formal opening within the next few weeks, Hon. Dr. Cody, Minister of Education as well as Hon. G. Howard Ferguson being invited to be present for the occasion.

Arrangements are to be made, it is understood, to provide a mining course for returned soldiers, including assaying, milling, cyanidation, flotation, surveying, etc. A number of applications have already been received.

On June 7th, the Hollinger Consolidated Gold Mines will disburse a one per cent. dividend to shareholders of record June 7th. The disbursement will amount to $246,000, and is the third of like amount to be paid this year.

The Hollinger paid its first dividend in 1912. Total disbursements since that time, including the June dividend, amount to $10,162,000. The net earnings are now well above requirements for 1 per cent. every eight weeks, and it is generally expected the rate will shortly be increased to 1 per cent. every four weeks, which was the rate up until a couple of years ago.

Interests in control of the Murray-Morgridge property, at Wolfe Lake, are stated to have made the necessary financial arrangements to resume operations at a very early date.

A small plant was installed about two years ago, and a limited amount of development work done, during the course of which some commercial ore was opened up in a wide vein. An endeavor is now being made to carry out a more or less extensive development programme.

Shorter Hours and Increased Wages Asked by Cobalt Miners' Union

The Miner's Union has shown a tendency to press for demands for shorter hours and increased pay, as well as recognition of the Union in the northern mining camps, including Cobalt, Boston Creek, Kirkland Lake, Porcupine and Gowganada.

A strike vote is to be taken Sunday, in view of the mining companies having not seen their way clear to grant the demands. The Union has asked for a forty-four hour week, and a minimum underground wage of $4.50, with time and a half for overtime, and double time on Sundays and legal holidays.

Although a strike vote is to be taken, and although there appears to be some possibility of the majority of the union members (which does not represent a majority of the mine workers), voting in favor of a strike, yet there is a feeling that a strike may not be actually called. The belief is growing that should a majority vote be secured, the union might hesitate to strike, and might prefer to request the government to appoint a commission to decide the matter. However, as to this, it would be folly to make a prediction and only the passing of time will determine the outcome of the present controversy.

The letter and wage scale as presented to the mine managers of Cobalt, follows:—

Cobalt, June 2, 1919.

To the Mine Managers,

Dear Sirs,—In accordance with instructions received from a mass meeting of the members of the Cobalt Miners' Union No. 146, held in the Grand Theatre, Cobalt, yesterday, June 1st, we received instructions to visit the mines of the Cobalt Camp and deliver the enclosed demands from the Cobalt Miners' Union. We attach the motion as passed for your information. You will observe by reading the motion that a reply is asked for within forty-eight hours and in order to avoid delay, preparation were at once undertaken to permit of a strike vote being taken on next Sunday, June 8th, should no satisfactory progress be made this week by way of reply or negotiations.

Copy of motion carried at yesterday's meeting:—

"That Executive Committee of the Local Union, visit the Mines of the Cobalt Camp to-morrow, June 2nd, and present our demands as adopted by this meeting and also at last Sunday's meeting; that the Mine Operators be given forty-eight hours in which to reply and that in the meantime, preparations and printing be instituted at once to take a strike vote next Sunday, June 8th, provided no satisfactory reply or adjustment be made in the required time."

Trusting you may see your way clear to confer in regard to the enclosed demands, we are,

Yours truly,

(Signed) JOSEPH GORMAN, Secretary, and others,
Executive Committee, Cobalt Miner's Union.

Following is wage scale adopted by Cobalt Miners' Union, Local 146, exclusive of bonus, concerning which a rider is attached at bottom of this scale.

Underground Men.

Minimum base wage for all underground men irrespective of their trade or line of work	$4.50
Men working in raises and shafts (no helpers)	5.50
(With rubber boots and oilers.)	

Surface Men.

Deckmen	$4.00
Deckmen, over sinking operations	4.50
General blacksmiths and all steel sharpeners	5.00
General blacksmiths and all steel sharpeners' helpers	4.50
Carpenters	5.00
Mechanics	5.00
Mechanics helpers	4.50
Hoistmen and engineers	4.50
Firemen	4.00
Compressor men	5.00
Pipefitters	4.50
Pipefitters helpers	4.00
Pump men	4.50
Diamond drill runners	5.00
Diamond drill helpers	4.50
Rockhouse men	4.25
All surface laborers	4.00

Mill Men.

Solution Men	$5.00
Roll and battery men	5.00
Repair men	5.00
Repair men helpers	4.50
Table men	4.50
Tuke and Ball men	4.50
Filter men	4.50
Flotation men	4.50
Press men	4.50
Jig men	4.50
Dryer men	4.50
Oilers	4.50
General mill laborers	4.00
Electricians	5.00
Electrician helpers	4.50
Lathe men	5.00
Motor men	4.50
Cooks, with room and board; per month	$135.00
Cookees with room and board; per month	85.00
Teamsters, with room and board; per month	90.00

In addition to above wage scale, bonus to be paid on price of silver as follows:

When the average price of silver is at or over 80 cents per ounce, a bonus of 25 cents per shift to be paid to each employee, and an additional 25 cents per shift for each ten cents per ounce above 80 cents average price.

In no case shall more than $1.00 per day be charged for board in company boarding houses, based on above wage scale. If more must be charged, wages to be raised correspondingly to cover the difference.

Eight hours per day to be maximum work day for all employees, both underground and on surface, with Saturday half holiday, with full pay, commonly called the forty-four hour week.

In case of underground men the eight hours per shift to be from collar to collar and not at the working face.

Time and a half for overtime and double time for Sundays and all legal holidays.

Recognition of the Union with collective bargaining and the check-off system.

MAGNITUDE OF TEMISKAMING PRODUCTION.

Despite the fact that what is now known as the district of Temiskaming, has been an important silver and gold mining district for more than a dozen years, and that a total value of $175,000,000 in silver and about $49,000,000 in gold has been mined, it is a remarkable fact that ore reserves now actually left in sight amount to about $125,000,000. From past experience it is probable many scores of millions will be added to reserve during the course of mining the gold and silver ore now in sight. Thus, value already produced and value actually in sight makes a total of approximately $350,000,000. Added to this is a good deal of evidence that would indicate that production has not yet reached the maximum, and that the thousands of miles of territory as yet practically unexplored may be found to contain as great or perhaps even greater deposits of precious metal than those so far opened up.

Altogether something like 11,666 tons of silver and about 120 tons of gold bullion has been taken out. Estimating each car to contain an average of about thirty-five tons, the output of silver would fill about 333 cars while the output of gold would amount to 120 tons and would fill amout three and a half cars. The total would make up close to seventeen trainloads of twenty cars to each train. When it considered that a good deal of the silver ore does not yield more than about one pound of silver to each ton of ore treated, and that an average of less than half an ounce of gold is taken from each ton of gold ore treated, it can readily be realized the tremendous tonnage necessary to yield seventeen train loads of bullion.

Further, in mining hundreds of thousands of tons of ore, it has been found necessary to handle scores of thousands of tons of waste rock. The whole process has necessitated several score miles of drifting, or cross-cutting, tunnelling and sinking — always in the solid rock — so extensive being the workings that if they were placed end to end it would constitute a tunnel through solid rock nearly from Cobalt to Toronto. There are a number of the mines each of which have done more than twenty miles of underground work.

Mining men and prospectors recently returned from the Skead township district report more activity in that area than since 1913. Several gold finds have been made, some of which bid fair to be of importance.

The shaft of the Wiscon-Skead has reached a depth of 100 feet, at which point a station is being cut, and arrangements being made to do some drifting.

In the past few weeks the position of silver has been reversed. Where the maximum price recently prevented an increase in quotations, that barrier has now been removed, and, instead, a minimum price of $1 an ounce has virtually been fixed. The reason for this belief is the fact that the treasury of the United States is to be restocked at a price of $1 an ounce for silver, to the extent of perhaps one-quarter of a billion ounces. The silver producers, therefore, appear to be assured of a favorable market for their product for a good many years to come.

In the aggregate the mining industry of the north never appeared to command so much attention as now. British and American interests appear to have awakened to the enormous potentialities of Northern Ontario, and there are indications that a large volume of much needed capital will be made available during the next few months for the exploration and the development of mineral deposits in all parts of the country.

A. H. Brown, mining inspector for this district, has recovered from his recent illness, and has resumed his duties.

C. H. Porrier, of New York, is making an examination of the Cullen-Renaud property, of the Allied Gold Mines.

J. M. Wood, of Toronto, is in the north on business.

W. E. Gowans, late of the C. E. F., and formerly of the staff of the Dome Mines, has been engaged as mine captain at the Miller Independence.

Frank L. Culver, president of the Beaver Consolidated, is in Kirkland Lake in connection with the Kirkland Lake Gold Mines of the Beaver Company.

C. D. Kaeding, manager of the Dome Mine, will return to the north this week from New York.

MINERALS SEPARATION.

Washington, June 5.

United States Supreme Court in the case of Minerals Separation, Ltd., vs. Butte & Superior Mining Co., has reversed the Circuit Court of Appeals of San Francisco in its holding that the patent covering the so-called flotation process is limited to one half of one per cent, or less of oil.

It upholds the contention of Minerals Separation that the patent covers any fraction of one per cent of oil. The case was remanded to the District Court of Montana for decree and accounting.

A well-known English coal periodical, commenting on the proceedings of the Sankey Coal Commission, remarks that it does not necessarily follow "because a man is good enough for a seat on a Commission he is fit to manage a mine."

The comment is acid, but it is meticulously accurate.

POWDER EXPLOSION ON UNDERGROUND TRAIN.

Wilkesbarre, Pa., June 5. — Sixty mine workers were killed and forty others injured at the Baltimore No. 2 tunnel of the Delaware and Hudson Company, near here, early to-day. A car of black powder attached to a train of cars on which the men were riding to their chambers in the mine exploded. An electric motor drew the cars. The trolley wire broke and sparks ignited the powder. Men were blown everywhere, but most of the deaths were caused by fire and suffocation.

MANITOBA MINING NEWS.

(From "The Pas Herald.")

The copper ore stored at Rocky lake is being brought to The Pas, unloaded into teams and transported across the town to the railway cars. The water in The Pas river is too low to permit of barges getting up to the ore docks. The ore is being brought down at the rate of 100 tons daily.

The Herald is advised that an interesting announcement will shortly be made in connection with the great sulphide ore body at Flin-Flon. Negotiations are taking place in New York between the owners and American capitalists.

The Pas Consolidated, the Rex and the Northern Manitoba, are three properties at Herb lake it is hoped will get going sometime this summer. At present there is nothing more than current reports of their intentions to prosecute active mining. Lack of funds is an ailment common to all three.

W. J. Young, mining broker states that he has received far more inquiries for mining properties this spring than at any previous period. Gold claims appear to be in greater demand than sulphide properties. He finds the situation very encouraging.

C. W. Greenlees is in from Schist lake with a story of a new sulphide ore discovery on the north end of that lake. Samples of ore were shown, and the stuff is something similar to the Flin-Flon ore. The finders are Pete Davidson and Baptise Lavasseur. The location of the strike is exactly on the tip of the lake end, west of the Pineroot river, and well in line between the Mandy mine and the sulphide ore deposit at Flin-Flon. Six claims were recorded on this strike.

An important discovery of silver-lead ore is reported by Mr. J. P. Gordon, ex-chief engineer of the H. B. R. It was made on a claim near Copper lake, in the Athapapuskow area, and the ore body is said to be large and well defined. Mr. Gordon brought an assortment of the ore to The Pas, and it is noted that he is the first one to cross the numerous lakes at such an early period as May 12th. He found the ice all gone from them.

A. L. Stewart and Bob Hassett have two claims on the N.E. arm of Lake Athapapuskow, about a mile and a half in from the shore, with a vein of chalcopyrite, measuring from 8 to 10 feet wide, and assaying 10 per cent copper with small gold and silver values. The vein is stripped for 60 feet, and a hole four feet deep sunk across it in one place. Considerable development was done during the last three months, and the owners are elated over the showings.

J. A. Cameron, of Regina, is another owner of claims at Athapapuskow with excellent showings. On one claim there are three open cuts, with 10 per cent copper showings. No. 1 is 50 feet long, 10 wide and 10 deep; No. 2 is 20 long, 8 wide and 4 deep; No. 3 is 30 long, 6 wide and 14 deep.

The ice in Athapapuskow went out on May 10th, the earliest period in years. Reports reach The Pas that all northern lakes were free of ice about the 10th of May.

THAT TECK-HUGHES VEIN.

Kirkland Lake, June 5.

The acting manager of the Teck-Hughes invites the author of the story that the mine a few days ago discovered $30 ore to come up and show the vein to him.—Toronto World.

FIXING THE WORLD'S SILVER PRICE.

Boston—Four dealers in Oriental exchange, meeting daily at the London Metal Exchange, determine the world's price for silver metal, and upon the basis so fixed the New York dealers and producers arrange their own market price.

An exception existed during the period when the Washington authorities, working in conjunction with the British Government, fixed the price and regulated the international movement. This step was taken in order that India's requirements might be supplied from American treasury stores.

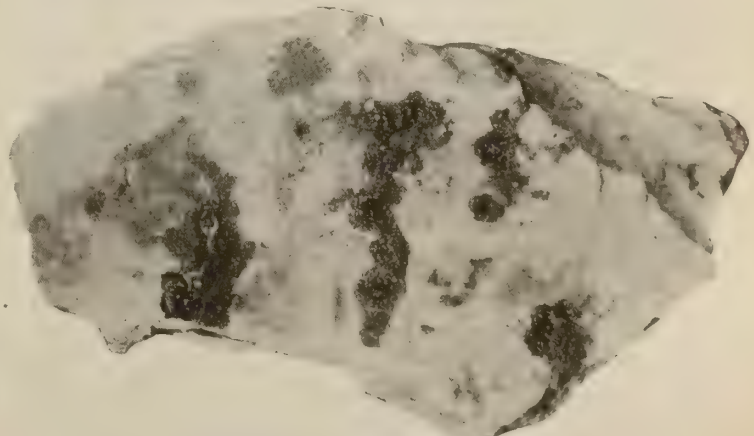
London for many years controlled the copper market as well as the prices for lead, spelter, tin and silver. Through the organization of the Copper Export Association in New York and the breaking up of the German metal combine, the copper market control has reverted to this country, where it always belonged.

The United States is the largest individual contributor to the world's silver yield, and the producers have in mind, it is understood, the establishment of means necessary also to fix the price.

While London, handling India's requirements, dominates the greatest consumptive field for silver, New York actually controls the production.

The past fortnight has shown positively that London still controls in price fixing as it has been practically impossible to secure quotations on silver until after London cables have been received. Owing to the speculative influence abroad silver, since its release from government control, has had a rise of nearly 20 cents an ounce followed by a reaction of 15 cents.—Boston News Bureau.

Apropos of the occurrence of elaterite, or elastic bitumen, in a fluorite vein at Madoc, Ont., reported in the Journal recently, it may be interesting to recall that an occurrence of this rare mineral was reported by Professor Boyd Dawkins as occurring near Castleton, Derbyshire (Eng.) in the Carboniferous Limestone, not far distant from the site of the reported finding of petroleum in one of a series of boreholes which are being put down by the British Government. The consensus of the most eminent geologists of Britain has been that a search for oil in Derbyshire, was, as one veteran inspector of mines said, "the wildest of wildcat schemes."



"Elaterite" or Elastic Bitumen.

The Iron Industry in British Columbia

From Our British Columbia Correspondent.

The development of the iron ore deposits of British Columbia is a problem very prominently before the Provincial Government. During the past two months preparations have been made by W. M. Brewer, resident mining engineer with headquarters at Nanaimo, B.C., to ship ore from some of the at present non-producing properties to small smelters situated near Vancouver City for the purpose of experiment. Mr. Brewer is ready, it is understood, to carry out the terms of the Act passed at the last session of the Legislature authorizing the Government to supply the plants in question with the magnetite ore necessary to establish the practicability of producing in this country high-class pig iron at a reasonable cost. It is believed, however, that he now is met with the fact that the smelters are not in shape to handle the ore, and shipment is deferred until they are prepared to proceed with the work.

W. D. Fleet's Electric Furnace.

In the meantime the Government has been approached by Messrs. William Fraser, manager, and W. D. Fleet, electrical engineer, who are associated with the Magnetite Iron & Steel Company, with an interesting proposition. Mr. Fleet claimes to have perfected an electric furnace capable of producing pig iron from magnetite ores at a cost materially lower than is possible by existing methods. He has entered into an agreement with the Vancouver Company whereby the latter controls his process. The company already has an electrical smelter at Potlatch Creek, near Vancouver City, in which, together with outside equipment, there is said to have been invested some $40,000. Messrs. Fraser and Fleet explained this situation recently to Hon. John Oliver, Premier, and Hon. Wm. Sloan, Minister of Mines, as well as to other members of the Government, and asked for financial aid in carrying the work on which they are launched, to a conclusion. Mr. Fleet stated that before coming to British Columbia he was connected with the Canadian Copper Company at Copper Cliff, Ont., and that his experiments had proved that it was possible to produce pig iron at a cost of $13.55 a ton, with an assurance of a reduction to at least $11 a ton by the use of a larger unit.

After consideration of these and other representations the Government decided that it could not do more at the present time than to extend some small assistance towards the demonstration of the process. Accordingly it was later announced that $2,000 would be advanced the Vancouver Magnetite Iron & Steel Company to aid in proving the practicability of the Fleet Process as applied to the magnetite ores of the Province. With this sum and what will be privately subscribed it is proposed to proceed with the experiment on a small scale, and Mr. Fleet, who states that this can be done in the course of a month or two, is confident that he will be able to satisfy the authorities.

It is appreciated, of course, that, if a high quality pig can be produced here at the figure given, which is materially lower than is estimated by Dr. Alfred Stansfield in his report on the feasibility of electric smelting of British Columbia iron ores, it will mean much to the mining industry of the northwest. In fact it is felt that the practical demonstration of the verity of Mr. Fleet's contentions would result in the early establishment of the iron and steel industry on a considerable scale.

The Port Moody Steel Mill.

With further reference to the local manufacture of steel, interesting evidence was given recently by G. P. Grant, manager of the Port Moody Steel Mills, before a Royal Commission appointed to investigate the condition of enforced idleness at Vancouver shipyards owing, it is stated, to lack of necessary construction material. Mr. Grant said that he did not consider his company was getting enough orders from the Dominion Government in view of the fact that his was a B.C. firm making B.C. steel. He asserted that his plant was in a position to handle larger orders. There was a twenty-one inch mill lying at the plant unassembled because there was not enough work to warrant its being installed. It could be put in working order in two months. Explaining the system used by his firm for making steel by electric smelting, Mr. Grant said that they used scrap, large quantities of which was supplied by the shipyards. The scrap was all put in the furnace, and refined, and the angles used by the shipbuilders were all made under the supervision of Lloyd's inspector, who passed the material before it left the plant. His firm had no trouble in getting the material without going to the United States or to Eastern Canada and had little or no trouble in operation. "We have been running," he stated, "twenty-four hours steadily with only four hours shut-down and only three or four reject heats."

TRAIL SMELTER NOT TO BE CLOSED.

The Consolidated Mining & Smelting Company, which operates the Trail Smelter, asked 75 men from its Rossland mines, on account of the good progress on development work there, to go to the company's Sullivan Mine at Kimberley, the most important zinc and lead producing mine in Canada.

This apparently gave rise to a rumor that the Trail smelter had closed. There was no foundation for the story as the company is operating the plant as usual.

TO DEVELOP THE YUKON.

The Yukon Development League is asking the Federal Government for a grant of $100,000, to assist in the development of lode mining. The League suggests the Government send a mining engineer to the Yukon with authority to spend the appropriation on the properties that, in his judgment, are most promising, provision being made to secure the advance by first liens on the properties on which it is spent.

The League is also asking that a railway survey be made from Hazelton or some point on the Grand Trunk Pacific Railway in British Columbia, and Dawson, with the idea of constructing a railway to Dawson at an early date.

The League wishes to have telegraphic communication opened between Eagle, Alaska, and Minto Bridge, near Mayo Landing, on Stewart River. Eagle is connected with Dawson by telegraph.

Dr. Alfred Thompson, the member of Parliament for the Yukon, is now busy on these matters in Ottawa.

Special Correspondence

BRITISH COLUMBIA.

Smelter Charges.

The report of the special committee which has been investigating the smelter charges of the Consolidated Mining & Smelting Company at Trail, B.C., will be forwarded to the Minister of Mines, Ottawa, at an early date. Its findings are awaited by the operators of the Kootenay and the Boundary Districts of the Province with interest. The personnel of the committee is S. S. Fowler, chairman; and Ivan deLashmutt and James Anderson.

President W. H. Nichols Visits Granby Properties.

Dr. W. H. Nichols, President of the Granby Consolidated Mining & Smelting Co., the greatest copper producing concern of the Pacific Northwest, made a tour of British Columbia during the month of May. His object, primarily, was to inspect the properties of the Granby Company. Accompanied by the company's General Manager, F. M. Sylvester, he visited the new colliery at Cassidy's, Vancouver Island, which has been producing some 2,500 tons of coal a month since shipment was commenced, and the equipment of which is reputed to be the most modern and the finest in every respect in the Province. The plant, of course, is capable of handling a much greater output, in fact, it can scarcely be said to have commenced operation in earnest as yet, such development being deferred until the company is prepared to handle the coal at its new by-product coking ovens, which are situated at Anyox, B.C. From this point Dr. Nichols and party proceeded to Anyox, the company's copper producing centre, where is situated its smelter, and near which are its largest mines. This was Dr. Nichols' first trip to Anyox, and he was much interested.

In interviews given in the course of his tour Dr. Nichols said. "If our country was neutral, there was never a day's neutrality with us." Speaking of the production of chemicals during the war, he said, as Chairman of the Advisory Board on Gas Warfare for the United States, that it was the work of the Board to "go the enemy one better" in the manufacture of gases for offensive purposes. In one plant alone 100 tons of mustard gas was being produced daily when the war ended. Had the war not ended when it did a gas attack would have been made on the enemy from Belgium to Switzerland. The production of acids for explosives also had exceeded the best expectations of the United States Government.

Dr. Nichols said that he was now giving attention to industrial development, especially on the Pacific Coast. He was much interested in the Granby properties, naturally, but, as well, found food for thought in contemplation of the natural resources of the western country. The immense wealth of timber possessed by the Pacific Northwest led to the belief that the manufacture of paper was destined to become a leading industry. Chemists would find a means of making the timber now wasted available for the production of paper.

The development of a steel industry, too, he thought quite feasible. With the abundant deposits of magnetite ore said to exist, together with the enormous electrical energy which could be developed from the many great natural water powers, he considered that the electrical development of iron ore bodies was a project of great promise.

The Ore Testing Mill.

The suggestion that the ore testing mill which the Dominion Government proposes installing in British Columba, should be placed on the Coast is vigorously combatted by the mining men of the Provincial Interior. F. A. Starkey, secretary and manager of the Nelson, Slocan and Eastern British Columbia Mining Association, has addressed a protest to Hon. Martin Burrell, Minister of Mines, Ottawa, in which he comprehensively enumerates the claims to the proposed plant of that section of the Province represented by the Association. He says in part: "It is true there are complex ores at the Coast, but they are chiefly copper and iron, which generally require smelter treatment only. Bodies in the North are developed to but a small extent. The interior, on the other hand, has complex ores of all varieties, and has developed them to such an extent that if the problem of treatment were solved they would immediately produce tonnage. There may be some misapprehension as to what constitutes a testing plant, and what its functions are. Whatever the idea of the Government and its officials may be as regards what is necessary, and what will be of lasting benefit to the mining industry, we do know what the people and the miners of British Columbia want, and that they insist and will have. As their views may not previously have been placed before you for your consideration, it may be well to re-state them very briefly.

"You are no doubt aware that there are vast unworked mineral deposits in British Columbia. In addition to gold the principal resources are complex ores of silver, lead and zinc. Unless there contain a large amount of silver it is impossible to find a market for them in the condition in which they come from the mines, unless they first undergo the process of concentration to separate the lead contents from the zinc. If ordinary simple concentration is adopted by the miner, not more than half of the zinc with its proportion of silver is ordinarily recovered. Even if the smaller miner could afford to erect a concentrating plant, the results are generally of too wasteful a nature to be profitable.

"It is therefore necessary to apply flotation and magnetic separation for the saving of metal values. The ordinary miner has neither the means nor the knowledge to apply this process, for the first essential in a flotation process is to determine what modifications are necessary for his particular ore, and which means all the difference between success and failure. For this purpose very highly skilled and costly experts having a wide experience of every kind of ore are necessary.

"As an instance of this I may state that the Standard Silver Lead Mining Co. only adopted flotation in the year 1916, for previous to that time the highly paid experts employed by them were unable to obtain favorable results. Since that time great progress has been made in the art, but it is not anticipated that we will ever be able to dispense with the services of experts to determine the best procedure in each individual case.

"If a central testing plant were established at a

convenient point the expert in charge would be in a position to definitely determine the best process for each ore, and so encourage the miner to lay out capital on his concentrating plant without the fear of losing his money, which has so often happened in the past.

"It is further our opinion that quite apart from the direct value of a Government plant for this purpose a modern concentrating plant would pay a good profit by the impost of a small charge for custom ores.

"If I may remind you the idea of such plants originated in this district, for an organized attempt was made to interest both Federal and Provincial officials in its advantages to the whole country. The proposal was that small but efficiently equipped government concentrating plants should be located in positions that each would serve about half a dozen small mines. These small mines could be operated if concentrating plants were available to make a marketable concentrate, and would contribute largely to the mineral output instead of being shut down as they must be until concentrating facilities are obtained."

The Lockwood-Dalziel Process.

Mining men have been watching with interest the demonstration in Vancouver, B.C., of the Lockwood-Dalziel Copper Recovery Process which appears to be giving satisfactory results. Those who stand sponsor for the process make four claims for it as against the present standard methods of copper reduction, viz.:

(1) A greater percentage of the copper contents of the ore is extracted—the method increasing recovery from five per cent to twenty-five per cent over standard methods.

(2) A saving in operating expenses of from two cents to five cents on each pound of copper produced.

(3) A reduction of from twenty per cent to forty per cent in cost of plant and equipment.

(4) Only ten per cent to twenty per cent as much water required as in other concentrating or leaching methods.

It is said by practical mining men with technical qualification that there is no doubt that apparently satisfactory results are obtained insofar as the separation and recovery of copper is concerned. Which is the most expensive?—rosting, leaching and depositing the copper by electricity as is done by the new process or the direct smelting of the concentrates after paying transportation charges on the latter from the mills. While the efficiency of the method appears to be admitted, there is no certainty on the latter point, although it is not at all improbable that the process will be given a practical economic test in connection with some one of the copper properties which now are in course of development.

Lucky Jim Mines.

The new Board of Directors of the Lucky Jim Zinc Mines, Ltd., is composed of Dr. H. C. Lambach, Spokane, President; George T. Edmiston, Spokane, secretary-treasurer; A. W. Allen, assistant secretary-treasurer; J. J. Collison, Victoria; Charles McKinnis, Charles Ehrenberg and Dr. T. A. Russell, Spokane, directors.

Tramway Installed at Wonderful Mine.

The tramway installed in connection with the Wonderful mine, situated near Sandon, B.C., is complete. It is about half a mile in length and has one span over a thousand feet in length without a tower, one of the longest spans of the Ainsworth-Slocan District.

Tramway from Sovereign Mine to Sandon.

Construction of a tramway from the Sovereign mine to Sandon, B.C., is in progress, the work being in charge of Irwin White. The Sovereign is one of the Cunningham properties and its ore will be treated at the Alamo concentrator. The Alamo mill it is reported to be almost ready for operation. The completion of the pockets and the elevating plant for the handling of ores from the Sovereign and Wonderful mines will put the concentrator in shape for work.

Portland Canal.

Portland Canal is attracting much attention and in this conection the recent announcement that the Big Missouri Group has been transferred by Sir Donald Mann to the Pacific Coast Exploration Company, Ltd., is interesting. William Noble, who is to have charge of the development of this property this summer, has gone in and proposes putting men to work immediately.

Will Develop Babine-Bonanza Property.

Further development of the Babine-Bonanza and the Emerald Group of Claims is proposed by James Cronin, the well-known mining operator of Spokane, Wn., this summer. He already is in the North to make arrangements for the commencement of work as soon as the season opens. On the Bonanza he intends to proceed with the driving of a tunnel to tap the main vein and incidentally to uncover a few other showings. Last fall a contract was awarded for this work and a good start was made before the snow flew so that everything is in readiness for resumption. The Emerald Group is not as far advanced, being as yet a prospect, comparatively speaking. Mr. Cronin has confidence in it and intends giving the work of developing it his personal attention. He states that there is every reason to believe that it will be proved a rich property as soon as the work decided upon is completed.

J. D. Galloway, mining engineer, reported on the Bonanza in 1917. He said that the development since 1909 had been corried on continuously, some work being done each summer and during several winters, a small crew of men being kept at work. Up to that time about $60,000 had been expended. All the work had been done by hand and had been expensive owing to the difficulty of getting in supplies. The total footage of shafts and tunnels at that time amounted to about 2,500 feet. As to the ore bodies, Mr. Galloway stated that they were of two types, viz.: Fissure-veins in rhyolite; and (2) contact replacement bodies lying between rhyolite and schistose argilite. "In both of these types," he continues, "galena carrying good silver values is the most important ore mineral."

California Mining Co. Will Develop Claims on Bird Creek.

The California Mining Company, with which are associated J. R. Cassin, of Spokane, Wn., president; W. R. Orndorff, of Spokane, Wn., secretary-treasurer; and W. H. Turner, manager, has obtained control of five mineral claims situated on Bird Creek, near Nelson, B.C., and proposes placing the property on a producing basis without loss of time. The development to date consists of two adit tunnels, the lower of No. 3 being in 1,200 feet, No. 2, 170 feet vertically above No. 3 is in 627 feet and ore from No. 1 is stoped to the surface. The vein is reported to be strong and well defined, and development has shown ore for a considerable distance in Nos. 2 and 3 tunnels which will average $17 a ton in gold. The Athabasca Mill has been leased for the purpose of handling the output.

SATISFACTORY PROCESS EVOLVED FOR TREATING SULLIVAN MINE ORES.

The presence in British Columbia of E. W. Beatty, the newly elected president of the Canadian Pacific Railway, who has been making his first transcontinental tour of inspection, was made the occasion of a formal announcement by J. J. Warren, general manager of the Canadian Consolidated Mining & Smelting Company, that the problem of the treatment of the complex silver-lead-zinc ores of the Sullivan mine at Kimberley, B.C., has been solved by S. G. Blaylock and his metallurgical staff of the Trail Smeltery.

This statement was made in the course of an address delivered after a banquet tendered Mr. Beatty and D. C. Coleman, vice-president of the C.P.R., at Nelson, B.C., by the Associated Boards of Trade of Eastern British Columbia. It is understood that Mr. Warren's announcement means that the metallurgists at Trail have been successful in evolving a method of treatment which will recover the silver, lead and zinc of the Sullivan mine ore, the importance of which will be better appreciated when it is understood that this mine has exceedingly large reserves and at present is the greatest producer of any property shipping to the Trail plant Mr. Warren also asserted that he believed that the problem of the treatment of the low grade gold-copper ores of the Rossland mines had been solved and that within a short time the Rossland properties of the company would be turning out between 2,000 and 5,000 tons of ore daily. High costs of production, and the fact that the price of gold has not risen to meet it, forced the company to reduce its operations at Rossland to a minimum. Since then it has been developing ore for shipment and working steadily on the problem of discovering a method by which the ore can be more profitably treated.

Prospecting is Necessary.

The mining industry was briefly referred to by S. S. Fowler, of Riondel, B.C., in a brief speech which he directed chiefly to the President of the C.P.R. He said that the Province was credited with having produced $350,000,000 worth of minerals other than gold, but the important thing was the development of the mines in the future. The greatest duty of the mining community today was to encourage prospecting. Either the old-times must be brought back or a new class of prospectors developed. "If new ore bodies are not located the District is bound to go back," said Mr. Fowler, who went on to assert that there was no doubt that there was much valuable mineral to be found and developed.

Smelter Charges.

Mr. Warren, who was called on a little later, opened by some complimentary references to Mr. Beatty, and then declared that he felt that he was under suspended sentence when it came to speaking of the Trail smeltery. At best he was "only an executive," but he was blamed when the price of copper went up and when it came down; in fact he seemed to be blamed for a little of everything.

Speaking of the future, he said that he would try to adopt a policy which would make for the development of the province. The smelter endeavored to make its charges fair, but not to give something for nothing. He did not think that would be good for the country, but he would give and do what he considered to be right.

Referring to Schedule B (which is the schedule of custom ore treatment charges of which there has been considerable criticism), he said that it was intended to be a basis for reasonable charges for the work done by the smelter. He was waiting the decision of the special committee which had the schedule under consideration, with a feeling that all should get together with a view to the development of the country. The smelter had been criticised for treating the ore from the Sullivan mine on a lower schedule than that charges for outside word, but it was forgotten by those responsible that it would be impossible for the smelter to operate without the Sullivan ore.

War Service.

The speaker told of the special operations carried on by the smelter to assist the Allies win the war. The company has saved the British Government over $6,000,000 on the cost of its zinc alone. In this statement Mr. Warren referred to the installation of Trail of an electrolytical plant for the recovery of zinc, the initial cost of which is understood to have been about $1,000,000 and which was responsible for turning out large quantities of the metal during the latter years of the great war.

Mr. Warren said he would like to see more co-operation with regard to the development of the Canadian market. Illustrating his point, the speaker told of observations made during a trip to Washington after the United States had entered the war. Mr. Warren had offered to sell lead at about two cents under the price which the American producers were receiving, and as a result was nearly driven out of the city. Recently in Canada the Canadian National Railways sent to Mexico to purchase lead when the smelters had several thousand tons on hand. He said that that sort of thing should be stopped.

Decreasing the Cost of Treatment.

He looked to the future optimistically, however. "We will soon be in a position," he continued, " to treat from 2,000 to 5,000 tons of Sullivan ores every day. S. G. Blaylock and his staff of metallurgists have solved the problem of treating the Sullivan ores at a reasonable price. They also have discovered a new low cost process for the treatment of the low grade Rossland ores. The research department at the smelter is working hard attempting to find ways to reduce the cost of the treatment of British Columbia ores generally and we will reduce Schedule B as soon as possible."

Mining and the C. P. R.

Mr. Beatty has given considerable attention during his tour of this Province to the mining and associated industries. He has visited the Rossland Mines and the Trail Smelter as well as the West Kootenay Power Company's plant. He also spent a short time at Nanaimo, the coal producing centre of Vancouver Island. Incidentally it may be mentioned that the announcement was made recently that the C.P.R. would proceed with the construction of an extension of the Esquimalt & Nanaimo Ry. from Alberni, the present Island West Coast Terminal of the line, to Great Central Lake. It is possible that this will lead to the development of the Big Interior and Ptarmigan Groups of Claims. They are both low grade copper propositions but, as far as development has gone, show immense deposits, the working of which is held back only by lack of transportation facilities.

THE DOLLY VARDEN MINE.

The position in regard to ownership and operation of the Dolly Varden Mine and its equipment, including the 18 miles of railway from tidewater at Alice Arm to the Mine, has developed in complicity during the past two weeks. Hon. John Oliver, Premier of British Columbia, has been officially notified by the Canadian Government, Ottawa, that it has received an appeal from the Dolly Varden Mining Company for the repeal of the Provincial Legislation under which the Taylor Engineering Company obtains authority to take possession of the property and operate it for the purpose of paying the claims of $462,000, which the Engineering Company has against the Mining Company, and the justice of which has been upheld by the Legislature. Premier Oliver interprets the notification as merely the extension of usual formal courtesies between the Federal and Provincial Governments. If, however, it means that the Province is expected to enter a defence of its legislation it is another matter, and it is hardly likely that the British Columbia Government will do so. Its position is that the legislation is within its jurisdiction, having to do only with civil and property rights, which are laid down by the British North America Act, as being within provincial purview. Disallowance by the Dominion Government, therefore, would precipitate a more or less bitter struggle and lead to exceedingly strained relations between the two administrations.

Meanwhile the Taylor Engineering Company is proceeding to take over the mine, etc., arrangements being under way for placing the property on a shipping basis, and for the operation of the railway over which the ore, of which a considerable tonnage has been proved by diamond drilling and otherwise, will be transported to the sea. Nor has the matter of water transportation been overlooked.

A new power freighter is being put in commission to carry supplies to Alice Arm. She has a 300-ton deadweight cargo capacity, and will be ready to start on the northern run shortly.

A. J. Taylor, president of the Engineering Concern, states that his plans are all made, that the mine will be re-opened without loss of time, that the railway will be operated, and that it will not be long before ore is shipped. He is confident that it will not be long before returns are received which will permit the payment of wages to those workmen who were employed on the construction of the railroad, and whose claims must, under the legislation referred to, be given first consideration.

Waiting for Concentrator for Rossland Ores.

Alarming reports were circulated recently to the effect that the Rossland mines of the Canadian Consolidated Mining & Smelting Company, as well as the Trail Smeltery, were being closed down. It is true that a considerable body of miners and workmen were released from Rossland, but the statement that it is proposed to cease operations entirely either at the mines mentioned or at Trail is emphatically denied by J. J. Warren, general manager of the company. In a statement explanatory of the situation Mr. Warren said: "We have been obliged temporarily to suspend shipments of ore from the Rossland mines because we have found it impossible to make ends meet with the prevailing high costs of both labor and material. We expect to resume, however, before the end of June, when the concentrating mill probably will be ready for operation. To continue in the meantime would not only result in financial loss, but in the serious wasting of our substance—in other words our ore reserves—of which there is only one crop. We are still keeping over 100 men at work in the Rossland mines. The resumption of Rossland ore shipments may be affected by the action of the Crow's Nest Coal Miners in deciding to go on strike, thus shutting off our coke supply, as the Rossland ores require a large quantity of coke for reduction.

Pennsylvania coke is now selling at very little above pre-war prices, while Crow's Nest coke commands $7.71 a ton f.o.b. ovens as against $4.50 a ton f.o.b. ovens before the war. We expect to be able to maintain our smelting operations, which have been continuous for over twenty years, excepting the short periods when our men or the coal miners took a holiday. It would be idle to pretend, though, that we are not passing through a very critical period. There has been, however, some little improvement in the lead situation—not so much in price as in there being a little better demand for the metal. Mexican lead is our chief difficulty. It was offered recently at less than 4c a pound f.o.b. Montreal in bond. We appreciate the co-operation of our men at this trying time, which cannot last for ever.

Outside reports, unauthoritative in character, are to the effect that the number of men let out at Rossland is considerable, and that, for the most part, they are men who have given expression of their support of the "One Big Union" idea. It also is stated that some 75 workmen have been discharged at the Trail Smelter. Mr. Warren, however, is credited with the statement that those who have been so released need not go idle, there being plenty of employment available for them at the Sullivan Mine, which is being developed on a large scale, and from which shipments of ore are to be increased.

The Rock Candy Mine.

The development of the fluorspar property, known as the Rock Candy, and situated near Grand Fork, B.C., by the Canadian Consolidated Mining & Smelting Company, is being vigorously prosecuted. J. J. Warren, general manager; M. A. Archibald, consulting mining engineer, and other officials of the company, recently inspected this property. After looking over the mining operations, they visited Lynch Creek, when the concentrating mill, newly installed, was in operation for the first time. The tramline, which will carry ore from the mine to the mill, also was demonstrated. The bunkers at the mill already are filled. The plant and the general equipment functioned satisfactorily, and everything is ready for work. The spur connecting the Kettle Valley Ry. with the concentrating mill is not yet quite completed, but the steel is on the ground, and will be laid without loss of time. As soon as this detail has been attended to operations will start and be carried on continuously.

BRITISH COLUMBIA

The Mineral Province of Western Canada

Has produced Minerals valued as follows: Placer Gold, $75,116,103; Lode Gold, $93,717,974; Silver, $43,623,761; Lead, $39,366,144; Copper, $130,597,620; Other Metals (Zinc, Iron, etc.), $10,933,466; Coal and Coke, $174,313,658; Building Stone, Brick, Cement, etc., $27,902,381; making its Mineral Production to the end of 1917 show an

Aggregate Value of $595,571,107

The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1895, inclusive. $94,547,241; for five years, 1896-1900, $57,605,967; for five years, 1901-1905, $96,509,968; for five years, 1906-1910, $125,534,474; for five years, 1911-1915, $142,072,603; for the year 1916, $42,290,462; for the year 1917, $37,010,392.

Production During last ten years, $296,044,925

Lode-mining has only been in progress for about twenty years, and not 20 per cent. of the Province has been even prospected; 300,000 square miles of unexplored mineral bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than those of any other Province in the Dominion, or any Colony in the British Empire.

Mineral locations are granted to discoverers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full information, together with Mining Reports and Maps, may be obtained gratis by addressing

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VICTORIA, British Columbia

Complete Tie-up in Crowsnest Section.

With reference to the strike of coal miners in District 18, U.M.W. of A. (Eastern B. C. and the Province of Alberta), the situation has developed since my last letter into a complete tie-up in the Crowsnest Pass Section. The mines are being kept clear of water only by the efforts of the superintendent and a few officials. The City of Fernie, which is dependent on the colliery power plant for its light, is in darkness. The output of coal, of coarse, has ceased, and the production of coke, as a consequence, also has stopped. The latter is likely to have a very serious effect industrially if it continues. The Trail smelter is very largely dependent on the Crowsnest for its coke. Recently a considerable body of men was discharged from the Rossland mines, which are operated by the Consolidated Mining & Smelting Company, and Mr. J. J. Warren, the company's manager, made the statement that the resumption of operations might depend on the action of the coal miners, as without coke the ore of Rossland could not be treated.

In Alberta the position is much the same generally speaking. From Lethbridge comes the report that the mine workers as a body are practically without funds. Before the strike there was about $10,000 in the union's treasury. Therefore, if the strike is continued, the suffering in labor's ranks will be severe. The Lethbridge City Mine is being operated because the Great War Veterans who are helping to man the mine insist that public utilities be maintained. Lethbridge City Power House, therefore, is supplied with fuel.

From Drumheller, Alberta, word is received that, although the strike of coal miners is general in the valley, the Rosedale mine, which is operated by Mr. Frank Moodie, has resumed work with a full crew of men. It is stated there that, while foreign workers are fairly well supplied with savings to continue the strike, the English speaking miners, who spend more money, will shortly be without resources. The strikers are still trying to persuade the engineers to join them so that the mines may be flooded and made inoperative for three or four months. The latter, however, evince a determination to work.

FIRE BOSSES ON DUTY AT FERNIE.

In Fernie District the fire bosses, on a strike vote being taken, decided to remain on duty as in the past to carry out inspection duties and guard against irrecoverable damage within the mines. They state the mine management requested them to do work which, in their opinion, carried them outside their duties, and they refused, whereupon their resignations were demanded. With two reported exceptions not a wheel is being turned at Coal Creek. The exceptions are the pumps in B. North Mine, which mine would become inundated within a period of 48 hours if they were suspended, and the fans in B. North and No. 3 Mines, their gaseous nature of these collieries making it imperative to continue the operation of the ventilating systems. Caring for and feeding of the mine horses and other absolutely necessary work is being carried on by the pit bosses, and clerical and official help still on duty. As near as can be estimated there are between 700 and 800 employees directly affected at Coal Creek; at Michel about 500, and at Corbin less than 100

Settlers' Rights.

A largely attended meeting was held recently at Nanaimo, B.C., to protest against the action of the Lieut. Governor in withholding his assent to the legislation passed by the Provincial Legislature in 1918, giving settlers within the E. & N. Ry. Belt an opportunity to claim the coal rights on their property. Addresses were delivered by Hon. Wm. Sloan, Minister of Mines, J. H. Hawthornthwaite, M.P.P., and Harvey Murphy, the latter being president of the Nanaimo Board of Trade. The former went fully into the history of the settlers' struggle for the coal on their property, and argued that they were asking no more than justice, which should be accorded. Messrs. Hawthornthwaite and Murphy encouraged the claimants to persevere, assuring them that, with right on their side, they would be successful. The following resolution was enthusiastically carried:

"That this meeting emphatically protests against the action of the Lieutenant-Governor in refusing his assent to the Settlers' Rights Bill, and demands that consideration of assent be given forthwith.

"And be it further resolved that this meeting protest against any invasion of recognized provincial rights."

Reserve Mine Closed.

The Reserve Mine, Canadian Western Fuel Company, which is situated near Nanaimo, B.C., has been closed indefinitely. Thus some 200 underground workers and 60 or 70 surface workers are out of employment. The output of the Reserve Mine has been maintained for years at about 10,000 or 11,000 tons of coal a month. The Canadian Western Fuel Company now is operating No. 1 Mine, Nanaimo, with a production of about 30,000 tons of coal a month, and the Harewood Mine, which has been producing in the neighborhood of 22,000 tons a month. The Wakesiah Mine, also near Nanaimo, is still in the development stage.

INCREASED DEMAND FOR GOLD AND SILVER.

The war caused a universal absorption of the available gold supply for credit purposes. It went mostly into the great state banks of issues and national treasuries of the world. It came mostly out of circulation. The vacuum so created, and more, was filled by paper emissions, of more or less doubtful redeemability.

But the world cannot remain satisfied to have billions upon billions of paper circulating as money. The world's bank deposits doubled during the war, going from $25,000,000,000 to $50,000,000,000. It is estimated that note currency increased $100,000,000. In Germany alone there is $7,000,000,000 of new bank notes brought into being on account of the war.

Hence, there will be an increased demand for metallic money, gold and silver, for years to come to supplant, in a measure, this paper circulation. Gold and silver mining will be an economic urgency

But the production of gold has certain limitations. It is only found in paying quantities in certain quarters of the globe. And its price is fixed according to the monetary standard.

It is silver, therefore, that will be relied upon to a great extent, to fill the necessities of coinage. Here there can be extended a premium to encourage production. The United States government has done so by establishing a minimum price of $1 an ounce for silver for an indefinite period.

Over the period of the war the total stock of gold money in the world increased about $1,575,000,000. But in that period the stock of gold in the state banks and treasuries of the world increased approximately $3,125,000,000, or nearly twice as much. The difference is the result of that striking development of the war, namely, the withdrawal of gold from circulation and its concentration under the control of government institutions. The money came partly out of the private banks, but mainly out of the pockets of the people. These figures are based upon returns of the world's output, with due allowance for the gold absorbed in the industries and by India and Egypt.

Gold Circulation $1,500,000,000 Smaller.

Thus, the world's gold circulation, in spite of the increase in the general supply, is to-day smaller by over $1,500,000,000 than it was before the war.

At the end of 1913, 63 per cent of the total stock of gold money was in state banks and treasuries and 37 per cent in the hands of private banks, and the public. On June 30, 1918, the proportions were 85 per cent and 15 per cent respectively.

The proportion in the hands of the public, apart from private banks, before the war, was estimated by the Manchester Guardian of England to have been probably about 30 per cent, mainly in France, Germany, United States, United Kingdom and Russia; while to-day it must be far smaller than the 15 per cent mentioned above. "It may be," said this authority, "that for some years to come gold will not be allowed to circulate freely in European countries for internal purposes, for the amount of gold required by the central banks as a basis of their note circulation and the structure of credit it will have to support will be very great."

It is to be noted along this line that the British currency report issued late last year recommended against complete return to the internal circulation of gold coin that obtained in England before the war.

Before the war the United States held about 25 per cent of the world's stock of gold. To-day it holds 33 per cent.—Boston News Bureau.

An article on the "Efficient Compression of Air' in "Mining & Scientific Press," suggests for the purpose of detecting leaks in compressed-air transmission lines the practice of an Illinois man "who, at regular intervals, puts essence of "peppermint into the air system, and then has all the pipes "inspected. Leaks are revealed by the odor." We can imagine some entertaining possibilities if this method were tried in some collieries our readers know of.

The Technical Supplement to the review of the foreign press, which is issued fortnightly by the British War Office, reproduces a report from the Austrian Chemical Journal that the Hungarian Department of Agriculture has decided to transform the Magyarovar Explosives Works into a factory for the manufacture of artificial manures. The note is headed "From Explosives to Manures." Without desiring to accuse the War Office of levity, is this heading a gentle hint of the modern expression of the ancient formula "swords to ploughshares and spears to pruning hooks"?

:-: EDITORIAL :-:

THE OIL CONCESSION CORRESPONDENCE.

On April 25th a complete return of the correspondence, telegrams and other documents in connection with the application of the Shell Transport and Trading Company for the grant of certain oil lands was made by the Department of the Interior. Several articles have appeared in this journal during the past winter concerning the proposed concessions. We did not at the time have copies of the correspondence, and we are reproducing parts of it in our next issue for those of our readers who are interested in the matter. It will be noted that the original proposal was definitely turned down by the Department of the Interior in January, 1918. There were subsequent proposals, however, and the memorandum of the interview granted by Hon. Arthur Meighen to Sir Reginald MacLeod and Mr. H. N. Benjamin on July 13th, 1918, is especially interesting. The proposal of these gentlemen was finally turned down in March, 1919.

We have little doubt that most of our readers will commend the decision of the Department of the Interior with reference to these applications. Those who wish to develop oil fields in Western Canada, whether they be big companies or little fellows, should be governed by the mining regulations. There should be no special favors for the corporations that have great financial resources. They can enter the field on the same basis as the pioneers in the Western oil fields, and their financial ability to do things on a large scale should not frighten them out of the field, unless they fear that their exploration ability is not on a par with that of the men who are already in the field.

It will be a good thing for the Northwest if exploration work, such as proposed by the Shell Transport and Trading Company is carried on in the near future. We would be pleased to see this company go into the field and carry on the search for oil in a big way; but under the same conditions as others who have been searching for oil in Western Canada while this company has been seeking concessions.

We are willing to admit that any company would be pleased to have such concessions and we are not surprised that one company should ask for them. Their failure to secure concessions is not blameworthy. The government's failure to refuse them would have been.

Compliance might have brought about development more quickly than we will now have it, and the lost time is something that we regret; but we are very well satisfied that the people of Canada will prefer the loss of time to the loss of their oil rights, and that they would prefer to have a number of smaller companies exploring under the mining regulations rather than one big company operating under special privileges and controlled abroad. The Shell Company can now come into the country on the same terms as the other fellows, having satisfied itself that special concessions are not obtainable. We will be ready to welcome it when it does so.

FURTHER DECREASE IN BRITISH COAL PRODUCTION ANTICIPATED FROM EFFECT OF SHORTER WORKING DAY—INCREASED COST OF COAL TO CONSUMERS.

Sir Auckland Geddes has announced in the British House of Commons that following the commencement of the shorter statutory working day which comes into operation in July, the production of coal in Britain may be expected to decline still further, accompanied by an increase in cost to the consumer of over a dollar per ton. Sir Auckland Geddes stated that as far as possible to judge "the estimated output for the twelve months from July, 1919, after the reduced hours come into force, is between 214,000,000 and 217,000,000 tons a year, compared with 287,000,000 tons in 1913. The consumption of coal for inland purposes and bunkers, which was 210,000,000 tons in 1913, had fallen to 196,000,000 tons in 1918. Exports in 1913 were 77,000,000 tons, and in 1918 were 34,000,000 tons.

In order to preserve approximately the same quantity for inland consumption and bunkers from July, 1919, all present restrictions on consumption must be fully maintained, and, in addition, exports must be reduced from 34,000,000 tons to 23,000,000. After guaranteeing profits to the owners at the rate of four-pence a ton, the estimated deficiency on the working of the industry would amout to £44,600,000. This meant an increase to the consumer of about four shillings and sixpence a ton.

The members of the coal commission were supplied to-day with a memorandum and schedules relating to the coal output. The figures had been prepared by Sir Evan Jones, the coal controller. For the first twenty weeks of 1919 the output was at the rate of 242,000,000 tons a year, compared with 287,000,000 tons in 1913. The average number of men employed during the twenty weeks was 1,111,000, ex-

actly the same number as the average for 1913. The percentage of absentees due to sickness, injury and voluntary absence increased from 10.7 in 1913 to an average of 12.5 in the first twenty weeks in 1919, and to 13 per cent. in the four weeks ended May 24 last."

In a previous statement to the House Sir Auckland forecasted some reduction of the coal supply for industrial and domestic use in Britain, or a stricter limitation on coal exports, as the output of coal per person employed continued to show a decrease without any shortening of the hours of work.

The "Iron & Coal Trades Review" states that the output per person employed in and about mines has since the commencement of the war shown a persistent reduction. In 1915 production per man was 270 tons per annum; in 1918 it was 260 tons, in 1917, 247 tons, and in 1918, 232 tons. During this same period the wages of the miners have increased by close upon 120 per cent.

The production of coal in the United Kingdom in 1913 was 287,411,869 tons, and the ordinary home consumption of coal was something like 250,000,000 tons. If, as Sir Auckland Geddes anticipates, the British coal production should fall so low as 214,000,000 tons per year, it means that Britain will not even supply her own needs, and that instead of being an exporter of coal, she must become an importer. The train of consequences of such a reversal would be so calamitous that one does not care to dwell upon them. One must trust the essential good sense of the British people to see that the axe is not laid to the root of that industry which pre-eminently has enabled Britain to be a great industrial and maritime nation.

It may be noted that the output of 1913 was secured by the labour of 1,110,884 persons, which is slightly less than the number now reported as employed at coal mines in Britain. More men on the payroll, reduced production, lessened working hours, decreased efficiency during working hours, wages more than doubled—Britain is about to pay dearly for the preferential treatment demanded by and accorded to coal-miners.

PROPOSED EXPLOSIVES TESTING STATION AT OTTAWA.

Our British Columbia correspondent writes that Mr. J. G. S. Hudson, of the resurrected Explosives Branch of the Department of Mines at Ottawa, is now conferring wtih the provincial authorities in British Columbia on the desirability of a uniform set of regulations for Canada dealing with the manufacture, sale, transportation and use of explosives, more particularly in connection with mining and quarrying operations.

We also understand that the long-deferred appropriation for the erection of an Explosives Testing Station at Ottawa, under the direction of the Mines Branch, is now to be expended. The undertaking of this work was—like many other necessary undertakings—deferred because of the greater and more immediate necessities of the War, but we venture to assert that the great expansion of mining and qaurrying during the war period, and the more self-sustaining character of the explosives industry in Canada occasioned by the restriction of the sources of supply of the raw materials used in the manufacture of explosives, has demonstrated most clearly the necessity for an explosives testing plant in Canada.

The action of the Government will be welcomed both by the manufacturers of explosives and by all mine owners who have a proper sense of the responsibility that rests upon the user of explosives, a responsibility that touches not only the safety of the workman, but the quality of the product of the mine and the pocket of the owner.

In this connection we would draw the attention of our readers to a paper read before the last meeting of the Canadian Mining Institute by Mr. H. Y. Russel, the Manager of the Technical Division of the Canadian Explosives, Ltd., in which the author remarks: "Until such time as the Dominion Government establishes a Department of Explosives with a testing station, the best a user of explosives can do towards deciding as to the safety or otherwise of an explosive is to take into consideration the standing of the company manufacturng the article.

"In England there is a list of 'Authorized Explosives," that is, explosives which are authorized by the Home Office for use in work outside of coal mines; but in Canada this procedure has not yet been followed, and the permission of the mine officials to test an explosive in any working rests mainly upon the standing and reputation of the firm of manufacturers and the persuasiveness of the company's representative."

Those provinces of Canada which are most interested in the testing of explosives are the provinces containing coal mines, where any regulations limiting the use of explosives under dangerous underground conditions have been difficult to make because no government test or regulation existed which would specify exactly what constituted a "permissible" explosive for use in coal mines. It has been necessary to use British and United States standards for this purpose, which is distinctly awkward when the explosives used are manufactured in Canada. The officials in charge of the United States Bureau of Mines have always been most courteous in allowing the use of their testing station to Canadian applicants, and the literature distributed by the Bureau concerning the composition and the use of explosives has been of great value, but we believe our readers will agree that the mining industry in Canada is large enough and sufficiently important to justify us in having our own explosives testing station, and a department of the Mines Branch especially charged

to acquire and disseminate information as to the composition and use of explosives, and their use under specified conditions in mine workings.

We believe that a significantly large number of the coal-mine explosions that have occurred in Canada originated in blasting operations, and the recent disaster at Wilkesbarre is an example of the result of laxity in the handling of explosives underground.

THE BALTIMORE EXPLOSION AT WILKES-BARRE, PA.

The "Engineering & Mining Journal," commenting on the explosion of black powder in the Baltimore Tunnel of the Delaware & Hudson Coal Company, which occurred on June 5th, regrets that "obvious carelessness in handling large quantities of men and explosives in close proximity still exists."

We are a little puzzled, however, by a reference to the impossibility of avoiding the handling of relatively large quantities of explosives in coal mining which concludes by stating that "the inert character of black blasting powder—its comparative immunity to ignition from shock—undoubtedly causes a certain amount of carelessness in handling." No explosives should be used in a coal mine that are susceptible to ignition from shock. Mine explosives should be of a character incapable of explosion without detonation by a fulminate of mercury or other form of approved detonator, and comparatively innocuous in the presence of ordinary flame. Black powder, which may be fired by a spark, is an anachronism in a coal-mine.

We remember seeing, after the Waterford Explosion in July, 1917, a can, with the lid open, full of "Excelite," over which the full blast of the explosion had passed. Beyond the grey dust deposited by the blast upon the paper cartridge-cover, the explosive was uninjured.

On another occasion a small powder-storage house was blown to pieces by an explosion of detonators, and full cartridges of explosive were scattered over the surrounding country, uninjured and intact. Most "permitted" explosives are quite safe to handle and inert except when used with a detonator, but black powder—or gunpowder—is proverbially and notoriously dangerous, and its persistent use in coal-mines is a deliberate sacrifice of safety to custom and supposed cheapness. It is curious to note that the prejudice in favour of the use of black powder is chiefly found among the miners themselves, and is based, of course, on the fact that black powder, because of its slow disruptive character, is a "good coal-getter." Where black powder is used in coal-mines, open lights are usually found, and they form an ideal combination for the promotion of inquests, especially if there should be present, as is not unusual in coal-mines, a little gas and some coal-dust.

"A TYPICAL CASE."

The following editorial from the "Daily Times" of Victoria, B.C., sums up the unsoundness of the "One Big Union" idea admirably:

"A worker in the shipyards recently purchased a home on which certain payments are due. If he is able to remain on his job a few months longer he will have no difficulty in meeting his obligations. If he must go on strike and lose his revenue he will be in danger of losing his home, especially if the strike be prolonged.

He is a good trades unionist. His relations with his employers are satisfactory, his conditions of employment having been prescribed in an agreement accepted by the employing company and representatives of his union on the basis of collective bargaining. He cannot see why he should have to quit work, break an agreement ratified in his name, lose his home and inflict privation upon his family on account of a dispute in Winnipeg. He cannot recall that workers in Winnipeg imposed these disabilities upon themselves on account of labor troubles in Victoria.

Furthermore, he cannot see how a strike in the Victoria shipyards can help matters in Winnipeg. It cannot influence the Government of Manitoba in the slightest to relax its determination to refuse to take any legislative action until the sympathetic strike in Winnipeg is first called off. The proposition may be all right for the strike officials, for their pay still goes on, but it is poor business for him because in a strike his pay must stop. And this is a typical case."

The Winnipeg strike leaders would not, however, admit the propriety of a shipyard worker owning his own home. That would make him a capitalist, and, if we understand aright the beliefs of those who preach the righteousness of the dominance of the proletariat, the ownership of a house would have the effect of changing the moral nature of such a worker.

The doctrine that all men are separated into two classes, namely, the capitalist and the laborer, is a poisonous and depressing one, and its adoption is only conceivable by those who have no hope in the world. It is more wicked than feudalism, without its chivalry, and the idea is not distinguishable from the Hindu conception of caste. Its acceptance as a principle of political administration would mean that no man could ever hope to escape from the social status of his parents, and it would rivet upon the worker chains as strong as steel and as burdensome as lead.

The division of our Canadian people into two camps, inherently and everlastingly at enmity—which is the doctrine preached at Winnipeg—is so foreign to our national ideals, so exactly the opposite of the self-reliant and ambitious characteristics of Canadian men and women, that we need not fear its spread, except and unless we allow the growth of urban conditions of congestion and poverty that rob men of hope and ambition, and provide nurseries for the spirit of revolt that sleeps, or wakes, in every man, according to his circumstances.

REPRINT OF REPORT ON THE SUBMARINE COAL FIELD OF NOVA SCOTIA BY DR. HENRY S. POOLE IN 1877.

We reproduce in full in this issue of the Journal that portion of the late Dr. H. S. Poole's report as Inspector of Mines for the Province of Nova Scotia for the year 1877, which relates to the coal content and future workability of the undersea coalfields which fringe the shores of Nova Scotia and Cape Breton Island. The report referred to was the last made by Dr. Poole in his capacity as Inspector of Mines and may be regarded as his testament concerning the submarine coal tracts. The Journal has a large and valued circle of readers in Nova Scotia, where the questions connected with the extraction of the undersea coal are attracting much interest. Copies of the Report of the Nova Scotia Department of Mines for so distant a date as 1877 are not easily obtained, and Dr. Poole's statements are so pertinent to existing conditions and show such prescience and sound judgment that in the interest of our Nova Scotian readers we have decided to make this report available for reference.

When Dr. Poole assumed a distance of three miles from shore to be the boundary of profitable working he was in advance of mining opinion in Nova Scotia, but later developments have demonstrated that the extraction of coal may be confidently anticipated at distances from shore much exceeding three miles. The furthest distance from shore at which we know of coal being extracted is at the Whitehaven Colliery, where, in workings off the shores of Cumberland, coal is being successfully won at a distance closely approaching five miles.

We hope, in future issues of the Journal, to publish a series of articles dealing with various phases of undersea mining.

DRILLING FOR OIL IN NEW BRUNSWICK.

"Moncton, N.B., June 14.—The New Brunswick Gas and Oil Fields, Ltd., in the Stoney Creek field at Well No. 18, about eight and a half miles from Moncton, in their deepening process have struck the most prolific and deepest oil sands yet found in this field, at a depth of 2,622 feet. The oil came with such a gush that it flowed intermittently to the top of the derrick, a height of seventy feet above the ground. This is the first gusher struck in this field."

It is understood by the Journal that the interests of the New Brunswick Gas and Oil Fields have been acquired by the Anglo-Persian Oil Company, and that a systematic search for oil is now being undertaken. Four drills are now operating, and a genuine attempt is to be made to prove or disprove the oil-bearing nature of this New Brunswick territory.

For a good many years the town of Moncton has been supplied with natural gas, which is used locally for both lighting and heating purposes.

Mr. Matthew Lodge, who is the moving spirit in the development of the natural resources of coal, oil and gas in the vicinity of Moncton is optimistic over the possibilities of this region, and the Journal hopes to give shortly some authentic information regarding the recent developments.

The Journal understands further that the new interests associated with these New Brunswick properties intend to develop the large deposits of oil-shales in Albert and Westmorland Counties. Recent bores have proved these shales to a greater depth than previously demonstrated.

Mr. Lodge is an "entrepreneur" of the best type, who has spent a good deal of time combatting the doings of a very undesirable type of fakir that seems to have found New Brunswick a favorable operating centre, and it is largely owing to his persistent and well-founded belief in the value of the oil bearing occurrences of New Brunswick that reputable people like the Anglo-Persian Company have become interested therein.

The high cost of coal, and its probable still higher cost, combined with its comparative scarcity throughout the whole north-eastern portion of North America, has entirely altered the relative values of coal and oil as fuels. In this connection there is also to be considered the technical advances made in the use of oil and carbonaceous shales or lean coals as fuels. — F. W. G.

ANOTHER DIVIDEND.

A dividend of 5 per cent. was recently declared by the Belmont Surf Inlet Mines, Ltd., payable July 1st.

VANCOUVER DELEGATES TO THE NELSON CONVENTION.

At a meeting of the Vancouver Board of Trade, held Tuesday, June 10th, it was decided to send three delegates to the Nelson Convention.

The Vancouver Chamber of Mines is sending two delegates whose names have not been decided upon at this writing, but who will be two representative men prominent in the industry.

JOHN L. AGNEW,
Vice-President International Nickel Co., of Canada.

The Mining Industries in British Guiana

By J. BARKLEY PERCIVAL.

During the war gold, diamonds and other precious metals and stones in the colony were officially non-existent. Now that hostilities have come to an end, and the enemy, it is to be hoped, rendered incapable of further mischief for many years to come, there is no reason for silence concerning the existence and possibilities of the rich minerals which exist in the hinterland of the colony.

The principal mining industries at present are, of course, gold, diamonds and bauxite; the latter of very recent growth, and although by now fairly extensive, yet likely in the future to assume proportions of the very first importance.

It is not definitely known when gold was first discovered in British Guiana, but the first gold expedition went up the Berbice River as long ago as 1720. More than a hundred years elapsed before any well organized attempt at mining for gold was made by a company which discovered gold-bearing quartz at Wariri on the right bank of the Cuyuni. The project had, however, to be abandoned on account of the district being in dispute between British Guiana and Venezuela. In the eighties there was a revival and by 1886 the industry was so well established in the Essequibo, Mazaruni and Cuyuni districts that the first set of mining regulations was passed in that year. Gold production continued steadily to increase, reaching its zenith in 1893-4 when 138,528 ounces was produced. At that time the gold industry was in the heyday of its prosperity, and there has been no return to the good old days since that time, the yearly production averaged about 54,000 ounces. Gold bearing quartz is to be found throughout the colony; and all the fields where mining have been carried out have proved of value, rich finds being made in each. Perhaps the most valuable field for its size was at Omai, on the left bank of the Essequibo River, from which place over 50,000 ounces alone of the precious metal, valued at one million, seven hundred and fifty thousand dollars have been obtained from an area about sixty acres. This production was arrived at by working such instruments as sluices and "long toms" which here and there took the place of a dredge or a small stamp mill. Various factors contributed to putting companies engaged in crushing operations out of business; the Peters mine, which was worked from 1905 to 1910 being the last and, having during that period secured 39,017 ounces of gold. There are also now only two companies engaged in dredging, the Guiana Gold Company on the Kenawaeuk or Conawaruk, and the Minnehaha Company on the creek of that name. From 1906 until 1916 the former company had recovered 64,200 ounces, while the latter from 1909 to 1916 had made a total output of 14.059 ounces. Since 1884, at which time gold mining started in earnest, until the end of 1917, no less than two million ounces has been won from the goldfields of British Guiana and that, it must be noted, mainly from alluvial washing only. The war naturally caused a slump in gold fields activity, owing largely to the increased cost of supplies, and partly to the fact that laborers who used in the past to leave their homes for the interior found remunerative employment on the works of construction in progress on the coastlands. The industry also suffered from another and much more serious factor in that it is the only commodity in the world which has decreased instead of increased in value as a result of the war. The cost of securing the metal has increased considerably, and while the value of gold is nominally the same, its purchasing power has been reduced by nearly half. In spite of these crushing conditions the two companies operating in the colony have been plodding steadily along, and it is to be hoped that the concessions recently made by the Government in reducing the royalty on alluvial gold from 70 to 50 cents, and making mining and dredging companies pay a five cent tax on profits in lieu of royalty, will relieve the industry of part of its handicap and encourage a future expansion of the industry.

Diamond mining has not shared the misfortunes of gold during the war; on the contrary the output is distinctly on the up-hill grade. In 1913 there were 9,078 carats exported to the value of eighty-two thousand, three hundred and fifteen dollars. A slight increase in the next year was followed by a slump in 1915, but in 1916 there was a revival and in 1917 no less than 16,985 carats, equivalent to one hundred and eighty-five thousand, seven hundred and eighty-seven dollars, were sent out of the colony. The country being so intersected by rivers, the general means of transport is by water, and the facilities are good. There is steamer communication from Georgetown, the capital of the colony to all the centres of the districts from where boats and crews can easily be obtained to cover the remainder of the journey at a reasonable cost. The journey to the diamond fields is infinitely more strenuous and hazardous than to the gold fields for instance, but with the construction of the projected roads in the interior in the region of the diamodiferous area, many of the dangers of transportation will be avoided.

By locating themselves on the banks of the Demerara river at a navigable part, bauxite deposits which are now being worked have shown themselves to be more considerate, and there are other districts in the colony in which bauxite is known or believed to occur in positions in which the deposits may be commercially worked—in the north-west district, and on parts of the Essequibo, Berbice, and Corantyn Rivers. The possibility of the occurrence of extensive deposits of bauxite of good quality, has led the British Government to order a special geological survey to be made for the purpose of ascertaining the extent of the deposits in different parts of the colony. Provided that rapid and stable communication is established with the interior, and the Government avoids obstructive regulations, sufficient is already known of the wealth of the colony's minerals to invite capital for the development of one of the richest countries in the Empire.

Northern Ontario.—A new vein has been uncovered at the old Foster property, which has been operated under lease for the past eight weeks. The vein was found on surface as a result of stripping, and shows a vein about two inches wide in which silver occurs. Further work will be necessary before determining whether or not the find is important.

Submarine Coal Workings

Extract from The Report of H. S. Poole, Inspector of Mines, Province of Nova Scotia, Year 1877.

There is a popular fallacy that our coal resources are inexhaustible; it is even sometimes asserted that our coal measures cover 18,000 square miles. When it is remembered that that number represents the full area of the Province, a statement that our workable coal fields above high water mark, do not embrace one-sixtieth of that area, will not seem so surprising, or that the figures enumerating the available contents are easy of expression. Few probably are aware how restricted is the Pictou field; so far as proved, its total output, could not do more than supply the trade of Great Britain for four years. If then, the land fields are limited, the greater is the necessity for looking after the sea areas, which sooner or later will tax engineering skill to the uttermost.

The coast sections of Cape Breton and the Gulf shore early demonstrated the probability that the existing coal measures are but remnants of immense fields that now lie submerged under the Atlantic and Gulf of St. Lawrence. Outliers of the latter yet remain at George's Bay, Newfoundland, at Chimney Corner, Broad Cove, and Port Hood on the Cape Breton Coast, at Tracadie, Cariboo and other spots on the south shore of the Straits of Northumberland. Through this field faults have brought to the surface lower carboniferous rocks at the Magdalen Islands, at Margaree Island, Smith's Island off Port Hood, and Pictou Islands. Prince Edward Island remaining as a vast tract of undenuded overlying Triassic rocks, may, as the vale of Cheshire similarly related to the coal measures, yet be pierced by coal shafts. Of the Southward and Eastern Extension of the carboniferous rocks along the foreshore of the Atlantic coast, outliers are left in Rhode Island, at Chester Bay and Lennox Passage, besides the available coal field of Cape Breton County, which remains as a considerable portion of the outcrop of what may be called the Atlantic field.

How much of these submarine fields may in time be won can at the best be only a small portion of the whole, for the major part must lie buried until time changes the relative positions of land and sea. What proportion of the submerged field will be worked can only be roughly conjectured, for so many unknown quantities enter into the calculation. The thickness and quality of the seams, the faults and troubles to be met with in the workings, the cover to be left for security, the proportion of saleable coal obtained, the increased cost, the engineering difficulties to be surmounted as depth and distance from the operating centres increase, the relative value of labor to that of the fuel produced, these and other considerations have to be better known before an approach to accuracy in any estimate can be made. But basing a calculation on our present knowledge and our prospective ability to meet the anticipated difficulties within a reasonable limit of distance and depth, some idea of the future value of our submarine coal fields may be deduced, and the necessity demonstrated for even now so conducting all inshore mining, that ultimate deep-sea mining may be safely prosecuted.

Assuming for the present a contour line three miles from shore to be the boundary of profitable working, and four thousand feet the available depth, and that no seam under three feet will be worked, then taking into consideration the minimum cover of solid measures required by our present law, the reduction to be made on account of known anticlinals, and the average thickness of the seams along their shore crops, the submarine coal field of Cape Breton, from Mira Bay to Cape Dauphin will yield 1,866,000,000 tons. This estimate assumes that after allowing one-fourteenth for unavoidable loss and waste in working, 1,400 tons may be obtained from each foot acre as was assumed in the enquiry by the Royal Commission to ascertain the quantity of coal remaining unwrought in Great Britain. It is made up by calculating separately the area of each seam in each locality, and the figures given are the sum total of all, without allowances for other circumstances than those enumerated. It does not, however, presume to be more than a mere guess at the best, but for want of fuller information is sufficient to show the approximate future value of this field. For all that is yet known, the strata may rise seaward, and distant workings be cut off, although this is not so probable, as that workings may be limited by heavy faults. But here the regularity of the measures along the shore indicates no serious dislocations. The uniform slope of the sea-bottom also negatives a probability of the foreshore being bounded by heavy faults, but rather suggests that the area above water has been reduced by long continued denudation. The seams may thin out or deteriorate, but then again some that are thin and inferior along the crop may thicken and improve in quality to the deep. The proved seams on the land have only to be followed to show how much a seam may change its character and thickness within a mile or two.

As mining must, to a large extent ever remain a matter of accumulated experience, the subjoined information respecting past, present and prospective submarine workings on the English coast is given as of great practical value for us, and as suggestive for our guidance.

Sir George Elliott, who, from a trapper boy, rose by his own ability to be a member of parliament, and one of the most wealthy commoners and extensive coal owners of England, stated before the Royal Commission, already referred to, that in estimating the quantity of available coal under the sea along the coast of the County of Durham, a distance of only 3½ miles from the shore was taken, but that "he thought it is possible that a much wider extent will ultimately be worked by sinking shafts at a distance from the shore in the sea, especially taking into consideration that this portion of the coal field includes six seams of excellent coal, with an aggregate thickness of 30 feet. This would allow of a further distance, of say seven miles being worked. The Durham submarine field within the 10 mile limit, would then yield 2,200,000,000 tons. Sir George further stated that he actually had worked 2½ miles from shaft, and that he believed at great depths it would be possible to work 5 miles from shaft with shafts 10 miles apart. Respecting barriers be-

tween separate winnings, he thought it was not of so much importance under a great depth of cover as that it should not be allowed to take away the coal up to within a certain distance of the bed of the sea. "I feel," he said, "that there should be some mode of dealing with the subject, so that parties should not be permitted to work coal under the seas, rivers and estuaries in such a manner as to ruin and destroy a whole district."

Mr. W. Y. Craig, a mining engineer of high repute, when examined "inter alia" on the system of working under the estuary of the Dee gave the following evidence:—"We commenced at first working in the hard five-quarter seam upon the long wall system, and we opened off, leaving about 20 yards of pillar above the air heading; but we were obliged to abandon it. The dip of the measures is one in five, and we found that we could not get stuff to pack the roads without bringing it a considerable distance from the gob. The expense connected with keeping up the gob roads and the packings, caused us to abandon the long wall system, and then we commenced the ten yard drift, or what is commonly called Lancashire system. From each pair of up-brows we drove headings ten yards apart, and after extending those headings from 60 yards to 80 yards on each side of the up-brows, we took back the pillars, two on each side simultaneously. By that means we were able to do without timber, and we found this system of working best suited of any which he had attempted. The roof was very stubborn, and when in long wall working it did fall, it generally fell into the face, causing a considerable loss of coal and expense in reopening. The stone drift that intersected this, and the other seam of the series under the Dee, began at a depth of 135 yards, and the least cover on these workings was 100 yards. In the next seam working on the same system, all the coal was taken below where the cover was more than 80 yards. Another seam, the Durbog, was wrought on what is called the narrow wicket system. The bords are driven 5 yards wide, and a 5 yard pillar is left. The cut-throughs are about 20 yards apart. This system of working is adopted in order to bring on the creep, so to avoid a sudden fall and fracture of the surface. After it comes on, the district is abandoned for some time to allow it to settle and then the main roads are re-opened. None of the Pillars are taken out, and about 44 per cent. of the coal is entirely lost in pillars. It was not considered safe to work nearer than within 50 yards of the surface.

In working this seam the intention was to come to long wall work when there was 100 yards of cover, and between that and 60 yards of cover to pursue the narrow wicket system, leaving 44 per cent., and not to go beyond 60 yards with any description of work whatever. In the modified long wall which was tried in the lower range, roads in the coal were kept simultaneously going, and 40 to 60 yards of face were taken away, five yards being left on each side of the road, and 20 yard pillars between each two stalls, which are worked off on coming back.

In one or two falls there was a rapid discharge of water, but it took off again. In the bed of the river, at the thinnest part, there are about 14 yards of silt, in another part it is about 40 yards. And in the bed of silt there is a strong bed of clay which is quite impervious, and had it not been for that, Mr. Craig said, he would not have recommended going so near as 60 yards.

In answer to the question:—You heard the evidence as to the desirability of leaving pillars of coal, so that in the event of the sea water coming into any of these workings, the whole coal field might not be sacrificed; do you concur in that opinion?

Mr. Craig replied:—"I think that in working under water, at such shallow depths, there is a degree of uncertainty as to what may be the effect, and in winning out new districts, it would be desirable to have it divided, and to leave barriers."

Mr. T. E. Forster, in his estimate of the quantity of coal remaining unwrought in Northumberland and Cumberland, says:— It is assumed that for a distance of eight miles on the Cumberland coast two workable seams of coal will be found under the sea, making in the aggregate 11 feet of coal over an area of 16 square miles, then taking the extent to be worked seaward 2 miles, and allowing 40 per cent to be left, the available coal will amount to 101,376,000 tons. On the Northumberland coast his estimate takes the extent to be work seaward 2 miles, and along the coast from the Tyne Northward 20 miles, and in this case allowing 25 per cent. to be left, the yield will be 403,-200,000 tons.

Mr. G. B. Forster stated that he adopted the bord and Pillar system of working at Whitehaven; that the face was 2 miles in a line at right angles to the shore and 3 miles from the pit, and about 900 feet below the ocean in that particular spot, though the seam is worked at all depths from 60 to 70 yards downwards; the seam being 10 feet in thickness. The bords are driven 6 yards wide and the pillars are left 20 yards thick. The first working takes out in the whole 36 per cent., and about 16 per cent. more is taken out when the pillars are merely cut through by 5 yards cross cuts, which is done down to a depth of 180 yards. Below that depth all the coal is taken out. At a neighboring colliery at Workington the sea broke in when the whole of the coal was being taken at a slight depth—not more than 60 yards at the most. It is supposed a gravel bed communicated with the pit to the rise, and that it was not a fair break down of the strata. At Whitehaven the sea bottom is principally rock. Mr. Forster had worked large quantities of the Hutton seam on the Tyne, under the High Main water which was tubbed off, the High Main being exhausted and full of water with a vertical pressure from 70 to 100 fathoms. He was of opinion that it was desirable to have the mines under the sea worked in compartments; certain collieries on the Northumberland coast were with that view kept distinct, and it was proposed to keep a barrier of 40 to 50 yards between each sea face.

Mr. T. L. Cottingham, when describing his system of working under the estuary of the Dee, said the shafts were sunk on the shore of the river and tunnels were driven under it to intersect and work the various seams of coal dipping under it. The coal was worked on the bord and pillar system, the pillars being on an average 20 yards wide and the bords 9 feet wide. The length of the pillars varied from 40 to 50 yards; they were cut through at intervals of 30 yards and subsequently worked back. The depth of the shafts was 166 feet from the surface, and the coal was reached under the river at that depth and worked to the rise, to within about 30 yards of the surface, and practically all was worked out. The bed of the estuary was composed of sand and a stiff red clay, in some places 15 to 16 yards thick, which it was supposed would sink or sub-

side, but would not break through; at any rate they never had the river water in upon them. Mr. J. J. Atkinson thought that 2½ to 3 miles is about the extent which it is desirable to attempt under the sea.

In the estimate of the available coal under the Firth of Forth, Mr. Geddes places it at 1,800,000,000 tons, and off the Ayrshire coast at 158,000,000 tons. Besides these submarine fields there is also a tract off the South Wales coast, which will, it is anticipated produce a large quantity of coal. Considering then the great stake England has in submarine workings, we cannot do otherwise than regard the experience and expressed opinions of mining engineers and others so largely interested themselves in the future welfare of coal mining under the sea as of the utmost utility and value for us now, when precautionary measures may be easily adopted and their provisions recognized and strictly complied with.

Desirous of benefitting by the large experience of Mr. Richard Brown, late of Sydney Mines, he was written to on this subject April 27th, 1877. In reply he stated:—"In my opinion, wherever the overlying measures are perfectly sound and impervious to water, it will be quite safe to drive passage-ways in the seam under a cover of 100 feet, and to take out 50 per cent. of the coal under a cover of 300 feet beneath the sea. When the measures consist chiefly of shale free from slips there will be no danger, but where sandstones, which are generally traversed by open joints and cracks, predominate there will be great risk of sea water finding its way into the workings, as an instance of the latter I may mention the Jacobs pit at Sydney, where, when the south levels reached within about 3 chains of the shore, there was such an influx of salt water through cracks in the sandstone roof, that we were obliged to shut off all the South side workings by strong timber dams, although the thickness of cover was 240 feet at the sea level. Again in sinking the new shafts at Lloyd's Cove a heavy feeder of salt water was met at a depth of 257 feet below the surface. Hitherto no workings have been carried on under the sea at Sydney with a less cover than 450 feet. At the Saltern pit, Whitehaven, (where I spent many a weary day years ago), the uppermost of the three seams worked was 62 fathoms below the sea at the shore, under which it dipped at the rate of 1 in 9. Near the shore 36 per cent of the coal was taken out, but as the cover increased to the dip, the pillars were split, and 28 per cent. more taken out, in all 64 per cent. Now, with a cover of 600 feet all the pillars are removed.

When the first Act relating to Mines and Minerals in this Province was framed, knowledge of the lay of the coal seams of Cape Breton was not so general as it has since become through the labors of Brown, Lesley, Lyman and others. It was then deemed sufficient to leave the definition of any desired area to the individual discretion of the applicant, and merely restrict him as to its length and contents. Consequently many areas have been taken out in irregular shapes and with but little regard for local advantages. In fact, some are perhaps more inconvenient and unsuited for economical working than others would have been, had each field been laid off in squares without at all considering the line of outcrop of the measures. For land areas the system adopted answers well enough perhaps; but now that the general course of the coal beds is approximately known, and the future value of those under the sea recognized it is most apparent that the system is not best suited for the submarine. Instead of allowing distinct individuals to take out leases of areas, one beyond the other, it would undoubtedly have been better and more conducive to the interests of the country to have restricted each lessee to a certain frontage on the adjoining coast, taking into consideration the outcrop of the seams rather than a given superficial extent.

Private individuals holding such mineral rights as those reserved by the crown, would take care as far as possible, that known facilities for access and advantageous working of the whole fields should determine the boundaries rather than haphazard selection. As the law now reads, the whole of an area can be forfeited for non-working, but not so a part that could not possibly be worked by other than a neighboring lessee; and this matter is worthy of further consideration.

It is very certain that to work sea areas to the best advantage, operators should be in the possession of the land adjoining, or that a sufficient barrier be left unworked about their pits. In either case that the approaches should not be from workings in common along the shore line, lest water breaking into one panel should get round land-wards, and destroy a whole district. Mr. Forster was of the opinion that impervious barriers should be left on the land side or sea barriers would be of no use. In this respect our present law is not very explicit, though its general bearing is in accordance with the experience cited.

In England, where the owners of small lots of land are often the owners of the subjacent minerals, thousands of acres of coal are computed by the Royal Commissioners to have been irretrievably lost on account of the awkward position of the lots, the irregularity of the holdings and the refusal of such owners to sell or lease at reasonable rates to those who, working adjacent areas, were at one time in a position to mine them profitably, but who, prevented by extortionate demands from entering on such lands, abandoned their pits. Thus the coal contained was forever lost to the country, in that the separate lots are too small to warrant the sinking of special pits for its extraction. A waste from such a source in this country was in part met by the Crown reservation in grants of land of coal and other minerals, but warning by such experience may be had, and care taken that areas are leased of such shapes as may be most thoroughly and economically worked, if only the law will permit some discretion in the leasing to be exercised.

To avoid the difficulties which experience in England showed would militate against extensive sea workings, were no safeguards to be now interposed between selfish present interests and the future welfare of the coal industry, section 42 was inserted in the Mines Regulation Chapter of the Fourth series of the Revised Statutes. Mining was already being conducted under the foreshore of Cape Breton without sufficient regard for the special requirements of the position, when the Legislature sanctioned the section in question. The section proposed to check further damage being done, and to so control incipient operations as to secure approaches to distant sections of the fields. Not that it is likely in our day that the coal lying at extreme depths and in remote districts will be required, or that colliery establishments will be in a position to work outlying sections profitably, but for the benefit of those who will come after us and who otherwise might justly reflect on our short-sighted policy and indifference to the country's future welfare. The coal required by the clause to be left in barriers may be regarded as not necessarily lost for ever, it is only reserved until

all the available coal seaward has been won, when, if it be thought expedient, specified sections of the districts now reserved may then be removed. By the Act sections of coal are not destroyed or lost, but only reserved, while were no check put upon operations, instead of small barriers of coal being locked up as it were, whole districts undoubtedly would be endangered or irretrievably lost by a short-sighted system of "developing" property. Considering the extent of Cape Breton's submarine fields, and the shallow depths of many of the seams under water, with extensive croppings of valuable beds even into the sea itself, the extra inducements to pare as close to any prescribed limit as possible with a consequent increased risk in case of infringement, make it not improbable that a greater thickness of cover than is at present stipulated for may be advisable to ensure safety. The limit assigned in the act was suggested by the practice pursued on the English coast at Whitehaven, where the overlying measures appear, by published sections, to be similar in character to those of Cape Breton. The experience under the estuary of the Dee is of less service, since on our coasts there are no such thick and impervious beds of silt to choke a crowning in should one occur That a limit of 60 yards of solid measure is excessive few will question, for the risk is so disproportionate to the gain; and as a mistake realized can never be repaired, it is better to err on the side of safety. Further experience in pillar working in existing collieries may even dictate a wider margin as advisable for security.

To enable lessees of submarine areas to gain access to their property, the statute gives them a right to drive tunnels through the measures of adjoining areas. The wording of the clause is so general, that various constructions have been put upon its meaning, no strict interpretation having yet been given. The intention of the act is obviously to prevent jealousy or conflicting interest putting obstacles in the way of working areas lying under the sea. It is no less evident that the Legislature did not intend to go beyond this, and grant facilities to the one, to the inconveniences and detriment of the other. In granting the right to tunnel through the land of an adjacent area, the statute says "doing as little damage as possible," clearly meaning thereby that if there be one means of approach, that will incommode less than another, although it may be the more expensive, that means, in preference to the cheaper, shall be adopted.

Suppose a case, where it is proposed to tunnel through an area half a mile or more seaward: To drive in the coal would be cheaper and more expeditious than to go through an equally serviceable under or overlying stratum; or again, a slope in a seam might be proposed when a vertical shaft with a tunnel across the measures, would effect the desired purpose. In the case of steep lying seams, the advantage of access in the coal, might, in some cases, far outweigh the loss that would be occasioned the proprietor of the land area, from which barriers were reserved, and therefore it might not be advisable to define the right to merely driving through coal or other workable beds, and in no case in the beds themselves. But in the first case supposed, the isolation of the approaches in the coal seam would greatly interfere with the working of the inshore area, in fact it is not difficult to foresee such a condition of affairs that would not merely interfere, but actually prevent the working of the inshore area from one set of pits, by cutting the area in two, and making the operations on either side distinct. It may fairly be presumed that the statute is not intended to incommode the prior lessee, nor to cause waste of coal already won, as an interpretation sanctioning such a practice, would necessitate. The question might also be fairly asked, whether overlying drifts within the limit of 180 feet connecting with distant abandoned or drowned out excavations, would not require workings in a subjacent seam to be protected by the thickness of barrier required for security.

When the new Chapter was added to the Statutes which relate to the working of mines, the 40th Section respecting submarine workings was incorporated as bearing on a present necessity. At the same time it was felt that possibly on more mature consideration some modification might be found advisable. The preceding remarks have been made, and authorities quoted on this subject that if possible it may receive due consideration and be fully weighed while there is time to protect the coal interests of the future from further damage, and that the public may see that the matter is not one of mere opinion on one system of working in preference to another, but is of national importance; further, it should be remembered that any restrictions now imposed can at the worst only act as a drag on the development of the coal industry, while the results of neglect or indifference, sanctioning a penny-wise system, can never be remedied.

It was, however, felt when the sub-section 40 (3) was framed and submitted without protest on the part of our mining engineers that it probably would require amendment when the coal at great depths was to be won; though it was most essential to protect the frontage and to effectually shut off deep and extensive workings seaward from such as were shallow and liable to eruptions of water. The authorities quoted believe, and the practice at Whitehaven now safely carried on indicate that there is a depth at which all fear of irruption from above may be disregarded. At Whitehaven 60 fathoms is the limit. Mr. Brown and others are quite confident that at 500 feet all the coal can be removed with impunity.

Denudation has been mentioned as the probable cause of the small present size of our coal fields, the continuing action of the sea has therefore to be considered as an element of future insecurity. According to records at different spots along the coast, the rate of denudation appears to be irregular, and the present contour of bays and headlands would lead one to the same conclusion. At several places on the Cape Breton coast the roads have had of late to be moved inland, and the old tracks are even now half or wholly obliterated by the destruction of the cliffs; eight inches to a foot a year is probably the rate at exposed places. At the Joggins, an old plan shows that the rate has been about six inches a year. A large margin in barriers has consequently to be allowed to meet this element.

PERSONAL

Mr. A. A. Hassan has been examining several prospective oil fields in Texas for the last six weeks, has decided to open an office in Fort Worth, Texas, which is the logical oil centre, for practice in geology and making examinations and reports upon prospective oil fields and to transact oil business in general. His present address is at the Westbrook Hotel, Fort Worth, Texas.

Special Correspondence

BRITISH COLUMBIA.

Dolly Varden Mining Co. Request for Disallowance Recalled.

The position of the Dolly Varden Mining Company is still occupying attention in mining circles in British Columbia. It will be recalled that notification was received by the British Columbia Government from Ottawa to the effect that a petition had been submitted there asking for the disallowance of the Provincial legislation under which the Taylor Engineering Company is taking over the proposes operating the Dolly Varden Company's property at Allice Arm. This was done, it is understood from authoritative quarters, at the instigation of George Wingfield, Reno, Nevada, in whose name there stands a mortgage against the mine amounting to $150,000. It is understood that as soon as it was realized that the property was required by the recent statutes to pass to the control and ownership of the Taylor Engineering Company in default of settlement in cash of its claims against the Mining Corporation, Mr. Wingfield took the course indicated with a view to obtaining adequate protection for his mortgage. Apparently having been satisfied in the meantime that his investment under the new conditions was in no way jeopardized, Mr. Wingfield has caused the petition for disallowance to be recalled. It therefore would appear that there is no likelihood of the Provincial Government's legislation being questioned from Ottawa and the Taylor Engineering Company is free to proceed with its plans for the opening up and the placing upon a producing basis of the Alice Arm property.

The new mine staff, which has left for the North, is headed by Major D. E. Young, who has resigned from the Provincial Commission to accept the general managership of the Taylor Mining Company, Limited. Major Angus W. Davis, late of the staff of the Consolidated Mining & Smelting Co., at Trail, has been appointed superintendent of the mines. He will be assisted for a time by R. B. McGinnis, of San Francisco, formerly manager and engineer for the Dolly Varden Mining Company. The position of chief accountant and storekeeper, will be filled by H. S. Brownin, formerly office manager for the Canadian Collieries, Limited.

There is a short section of the grade of the railway from Alice Arm to the mine which has yet to be connected up by steel. For this purpose a cargo of rails is being taken north, and the work involved will be undertaken immediately. The Dolly Varden Company, before ceasing operations at the mine, is reported to have blocked out 20,000 tons of high grade ore. This, it is expected, will be shipped as soon as transportation facilities are provided.

The Taylor Mining Company, Limited, which has been organized for the special purpose of operating the properties in question has an authorized capital of $1,500,000, of which $1,200,000 is paid up. Assisting Mr. A. J. T. Taylor, the president, are R. P. Butchart, of Victoria, president of the B. C. Cement Company; Mr. H. C. Chiene, C. A., of Buttar and Chiene, who is also trustee for the creditors of the Taylor Engineering Company; Charles M. Rowlson, general manager of the Imperial Oil ompany, Vancouver, who is also acting as trustee for the debenture holders of the Taylor Mining Company, and Mr. John F. Tener, general manager of the Pacific Lime Company.

Major Angus W. Davis, the new superintendent of the mines, is a leading western mining authority. Before the war he was in charge of the Richmond Eureka Mine at Sandon, the Snowshoe Mine and the No. 7 Mine in the Boundary District and the Sullivan Mine in East Kootenay, all of which are properties of the Canadian Consolidated Mining and Smelting Company. He went overseas as a competent officer with the First Canadian Division, and because of his technical knowledge, was selected to organize and command the Third Canadian Tunnelling Corps, which post he held until mining operations at the front, in a large way, ceased with the successful mining of Messines Ridge. Subsequently he was in command of the Tenth C. E. Battalion.

Major D. Drummond Young, D.S.O., formerly Adjutant of the 72nd Battalion, C.E.F., who will be in charge of the general business and financial affairs of the company, has had considerable business and executive experience in England and in Canada, and his services were also requisitioned by the general staff in France.

A CORRECTION.

In our issue of the May 21st (page 367), it was incorrectly stated that Mr. Victor Dolmage, of the Geological Survey, Ottawa, had prepared a Report on the Cariboo Gold Fields, from the summary of which we quoted extracts. We now understand the Report was written by Mr. B. R. McKay, and are glad to make this correction.

PROF. WM. NICOL,
Professor of Mining, Queen's University, Kingston.

EXPLOSIVES BRANCH, DEPT. OF MINES.

Proposed Explosives Testing Station at Ottawa.

Joseph G. S. Hudson, of the Explosives Branch, Department of Mines, Ottawa, is making a tour of Canada on business of considerable importance to the mining industry. At present he is in British Columbia and has interviewed the Hon. Wm. Sloan, Minister of Mines, and other officials in the Provincial Department of Mines. He announces that it is the intention of the Federal Government to erect at Ottawa a powder-testing plant modelled after that at Woolwich, England, and the equipment of the U. S. Bureau of Mines at Pittsburgh. At the present time there is no provision in Canada for the official testing of explosives used in the mines of the country. The provincial governments have been authorizing the use of those explosives passed by United States government authorities or recognized and approved by the British government. Whatever course has been pursued, however, has been on the initiative only of the province and the policy therefore has by no means been uniform. Moreover, if necessity arose for the testing, say of powder or a certain grade of powder, and the coal dust of the mines in which it was proposed to be used, it was necessary to send samples either to Woolwich, or to Pittsburgh. With a plant at Ottawa as is proposed, not only will a uniform list of authorized explosives be adopted in Canada, but it will be possible for all such testing and experiments to be carried out within the Dominion. It is understood also, that manufacturers of explosives will be required to submit their output to test in the official laboratory and will be required to lay out their plants to conform to standard practice, so that plans of new establishments will have to be submitted to the proper quarters for approval. Another innovation suggested, is that regulations regarding the sale of explosives shall be uniform throughout the Dominion. This will be a marked improvement over the present somewhat haphazard method. Mr. Hudson's mission, therefore, is to lay these various proposals before the heads of the Mines Departments in the different provinces, explain them in detail, obtain suggestions, and generally to come to a clear understanding of the objects aimed at, so that when federal legislation is finally drafted it will meet conditions in all parts of the Dominion and be unanimously approved.

Dispute re Alice Arm Molybdenum Claims.

The case of Stewart vs. Molybdenum Mining and Reduction Company is being tried before the Supreme Court of British Columbia, involving a well known Alice Arm property. It appears that the defendant company started in to develop two claims on Alice Arm carrying molybdenum and about $100,000 was spent in the erection of mill, aerial tramway and other equipment. Subsequently a question arose as to the soundness of the title to the property. The plaintiffs claim that they were entitled to be paid some $35,000 under a bond which had been given to Stewart, McGraw & Haines by one Riel. After getting this bond, it is alleged, the claims were allowed to lapse through failure to do the assessment work required by statute, and it is asserted that the property was re-located by Riel and conveyed by him to the defendant company in consideration of the company alloting to him a large block of the stock, the conveyance to be free of all encumbrances. Later a dispute arose between Riel and the Company and Riel is now assisting the plaintiffs to upset the title of the Company to the claims.

Use of Diamond Drills Increasing in B. C.

Diamond drilling is being used to a larger extent in British Columbia in mining development than heretofore. The Provincial Government is carrying on operations of this character on the Snowstorm group of copper claims in Highland Valley near Merritt, B. C. The work was started last January and five borings have been completed. The sixth is now down over 600 feet. While no first hand information is available as to the results up to date, it is understood that the showings generally are good and that the outlook is considered promising. Drilling also has started on the property of the Aspen Grove Amalgamated Mines, Limited, which is under bond to Joseph Errington, and associates. This property includes about 75 mineral claims and the plan is to drill at least ten thousand feet for the purpose of proving the ore body. The surface showings indicate an extensive zone with good values in copper.

Haematite Deposits, Iron Mountain, B.C.

Three groups of haematite iron deposit have been located on Iron Mountain, B.C., and work has been in progress on two of them for several weeks. The Iron Dollar group is said to show extensive bodies of high grade haematite ore while the Titanic Group, situated on Sheep Creek, shows a body of brown haematite, the size of which has not been determined. A shaft is being sunk and thus far the workings are all in iron, the analysis of which shows metallic value as high as 63 per cent. One feature of the analyses is the comparative absence of sulphur, etc. The ores of the Titanic Group carry 4.35 per cent. lime, 3.41 per cent. carbonic acid, 1.50 per cent. silica, and insoluble silicate, .22 per cent. alumina and 27 per cent. oxide, with the 63 per cent. metal and only a trace of phosphorus, magnesia, and sulphur.

Improved Outlook in Portland Canal District.

News from the Portland Canal District continues to indicate much mining activity. The Premier Mine on Salmon River is reported to be developing a very attractive body of ore. This property has been examined recently by H. B. Price of New York; W. W. Warren, of Butte, and W. H. Young, of San Francisco. The Bush Company has commenced work on its property, which is located near the Premier. H. Howson, a mining authority, has made an examination of the Yellowstone group, which was recently bonded by Charles F. Caldwell, operator of the Utica Mine, Kaslo. The snow is reported to be disappearing from the higher ranges and prospectors in numbers are leaving the town of Stewart for the hills. Stewart, which since the 1910 boom broke, has gone from bad to worse, is becoming a very busy little community. Several new business enterprises have started and mining men, prospectors and business men are going in with every boat.

The Skeena Mining & Milling Company, Ltd., has secured a working bond on the Victory and Coronado Groups, Hudsons Bay Mountain, Northern B. C. These are the silver-lead zinc properties, very promising in character as far as development has gone. A 50-ton a day concentrator is to be installed and other equipment provided for the operation of the claims. The total expenditure involved being about $30,000.

Development Promised at Summit Camp, Tulameen District.

One of the most important mining deals reported from the Tulameen District in months occurred recently when Arthur E. Hepburn, of Vancouver, took a bond on seven mineral claims in Summit Camp. The claims included in the option are the Sutter No. 7, Nickle Plate, Huckleberry, Huckleberry Fraction, Sunlight, Sunbeam and Jumbo. It is understood that Mr. Hepburn is acting for English capitalists who propose to do considerable development work this summer. These properties it may be explained, are in silver-lead ore, one vein of which is said to range in silver values from 60 to 80 oz. with a percentage of lead sufficient to produce assay results as high as $300 per ton. Another lead shows about 12 in. of clean high grade ore in which some exceptionally fine values have been found.

Eureka Mine, Nelson.

The Eureka Mine at Nelson is turning out well under development, the ore body on the 250 ft. level being 17 ft. wide. The Granite-Poorman mill has been fitted up with a concentrator for the treatment of the ore and a flotation plant added. The ore is copper, carrying appreciable gold and silver values.

Progress at Sheep Creek.

Development of mining on Sheep Creek, near Salmo, B. C., has attracted much attention recently. The properties on this work is in progress look more promising as they are opened up. At the Nugget Mine excellent progress is being made with the long tunnel designed to crosscut and develop, at depth, the veins on the Nugget property. This tunnel has now been extended 350 feet, and is being continued at the rate of 200 ft. per month. In the course of a few months it will have attained its objective when the ore bodies will be opened up by raises and stopes prepared for mining. The Mother Lowe Mill then be placed in commission again and run to full capacity. Much is looked for in a mining way from Sheep Creek which is considered one of the best of British Columbia's gold fields.

VANCOUVER SYMPATHETIC STRIKE.

The strike of the steamer hands on the Pacific Coast Steamers is affecting the large mines up the Coast. Although the supply at the present time is sufficient, should the strike continue much longer it will be a serious matter unless some provisions are made for operating steamers to and from the different plants.

At the present time the Citizens' Protective League is being formed and plans are being perfected to obviate any serious conditions which may arise. Meantime all plants are getting along as best they can under the conditions.

IMPERIAL MINERAL RESOURCES BUREAU.

The Governors of the Imperial Mineral Resources Bureau have appointed Major W. M. Henderson-Scott, 1st Queen's Westminster Rifles, to be secretary of the bureau in place of Mr. Arnold D. McNair, C.B.E., who has resigned the appointment of organizing secretary.

Major Henderson-Scott is a gold medallist of the Royal School of Mines and an Associate of the Institute of Mining and Metallurgy. He has practised mining extensively in North and South America and has served continuously in France since 1914.

NORTHERN ONTARIO.

Nipissing Production.

During the month of May, the Nipissing mine produced $347,751, or an average of approximately $11,218 every 24 hours. This shows an increase of $127,824 over the April figures, and is the highest monthly production this year, and may reasonably be attributed to the exceedingly favorable developments on vein 109 and 99 noted during recent weeks in these columns.

In his regular monthly report to the president and directors, Hugh Park, manager, says:—

"During the month of May the company mined ore of an estimated net value of $347,751, and shipped bullion from Nipissing and custom ores of an estimated net value of $102,578.

"All stoping operations and general underground exploration and development continued to be satisfactory throughout the month. At 96 tunnel, development work on veins 99 and 109 continued to show good results, though not as continuous as in April. Vein 99 now shows 60 feet of ore, averaging two inches in width and assaying in excess of 5,000 ounces to the ton. In addition some 30 feet produced irregular amounts of high grade ore, the country rock, however, being of sufficient grade to be treated at the low grade mill. Vein 109 has been drifted on for 230 feet, and about 130 feet will assay in excess of 5,000 ounces to the ton over a width of two inches. The balance contains mill rock and some high grade ore.

"Owing to excessive surface water, some difficulty was encountered in starting new development operations at a level 90 feet below the tunnel. These difficulties have been overcome and cross-cutting has been started. Vein 109 is expected to be cut at a distance of 75 feet, and vein 99 will require somewhat more.

"At shaft 73, developments on vein 544 at the 550-ft. level were more or less satisfactory. Several raises were put up, and while developments indicated continuity of the vein, the silver contents were just too low to be profitable. A level higher up is necessary, and a station is being cut 50 feet higher up and the vein will be developed at that level.

"Stoping operations at 73 shaft continued to be satisfactory. No new veins were encountered in any of the cross-cuts. No favorable developments were met with at shafts 63, 64 and 128, Shaft 27 is being dewatered for examination. This shaft has been idle for the past 11 years.

"The low grade mill treated 6,645 tons of mill rock and 184 tons of high grade ore. The refinery shipped 101,053 fine ounces of bullion.

"The following is an estimate of production for the month of May:

Low grade mill	$177,126
Washing plant	170,625
Total	$347,751"

Miller Lake-O'Brien Mine.

The Miller Lake-O'Brien Mine, of the M. J. O'Brien, Limited, at Gowganda, is to be extensively explored, in addition to the usual amount of development work, according to reports coming from Gowganda.

Swastika.

High gold assays have been obtained from samples taken from a large sulphide dike, which runs east and west for several miles, crossing the boundary between the townships of Otto and Eby, a short distance south-west from Swastika. As a result, quite a large number of mining claims are being staked in that vicinity.

The first samples taken, show a gold content of upwards of $400 to the ton, with several ounces of silver per ton, as well as a trace of platinum. Steps are being taken to do further sampling in an endeavor to check up the former assays.

Lucky Baldwin Mine.

Operations at the 200-ft. level of the Lucky Baldwine mine, at Kenogami Station, continue to be encouraging. Cross-cutting is being done in a large dike of porphyry, in which bands of highly mineralized matter occurs. It is stated that certain sections of the dike carries gold in commercial quantities. A force of about twenty men are employed, and the motive power is supplied by a small steam driven mining plant. Some visible gold has been encountered.

Opening of Haileybury Mining School.

The formal opening of the Haileybury Mining School is to take place June 19th. The Hon. Dr. Cody, Minister of Education, will be among the distinguished visitors.

It is interesting to note at this time, that Federal support for technical education aggregating ten million dollars within the next ten years, the money to be paid to the provinces, is provided for in a resolution of which notice has been given by Hon. J. A. Calder, Minister of Immigration and Coloniaztion.

The Haileybury Mining School may reasonably be expected to share in the benefits of such assistance, and it is anticipated that it may make possible the plan which has been proposed to give short courses to returned men in milling, assaying and metallurgy.

Reeves-Dobie Mine—New Oil-flotation Plant.

The 100-ton oil flotation plant, being installed on the Reeves-Dobie Mine, at Gowganda, is nearing completion, and should be ready for operation very shortly, according to official information.

The property was formerly equipped with a forty-ton stamp mill, to which it is expected additional grinding equipment will be necessary in order to operate the flotation plant at full capacity. It is stated that not much difficulty is expected in being able to keep the plant running at full capacity on medium grade ore.

It has been definitely announced that the Nipissing Mining Company has dropped its option on the Ophir-Cobalt mine. The option had been held for some three months, during which time a considerable amount of exploration work was done with varying results. At two points, during the course of drifting operations, short shoots of ore were encountered, and apparently the result of work did not appear to justify the purchase of the control of the property.

Whether or not the Ophir Company will itself continue to operate the property, or interest other prospective purchasers has not been learned.

Dome Mines.

The directors of the Dome Mines, during their recent visit to the property, expressed themselves as being very well pleased with the progress so far made and as being decidedly hopeful of a prosperous future. The mill is operating at a moderate rate, and it will probably be some little time before full capacity is reached. However, between 300 and 400 men are now employed, and with efficiency increasing, it is expected almost normal conditions will prevail by the end of the current year.

Development work being conducted on the Dome Extension, which is under option to the Dome Mines, is favorable, and the general impression is that the option will be exercised before next March.

Kirkland Lake Proprietory Merger.

The merging of the interests of the Tough-Oakes Gold Mines, the Burnside, and the Alladin-Cobalt, including the Chambers Ferland mine at Cobalt, and the Sudbury Syndicate, is stated to be making satisfactory headway. The new company is to be known as the Kirkland Lake Proprietory. The Sylvanite is not mentioned in a statement just made, which may be summarized, as follows:

(1)—The Kirkland Lake Proprietory Company, whose issued capital is 125,000 pounds, will receive 250,000 shares in the new issue. That is to say, when the merger is completed, shareholders will receive a bonus of one share in addition to each share now held.

(2)—Shareholders in the Tough-Oakes Gold Mines will receive one Kirkland Lake Proprietory share for each two shares held in the Tough-Oakes Company.

(3)—Shareholders in the Burnside Gold Mines will receive one share in the Proprietory Company for each two shares held in the Burnside Company.

(4) Shareholders in the Sudbury Syndicate will receive 1¼ shares of the Kirkland Lake Proprietory for each one share held in the Sudbury Syndicate.

(5)—Shareholders of the Aladdin-Cobalt will receive two Kirkland Lake Proprietory shares for each seven shares held in the Aladdin-Cobalt.

The Kirkland Lake Proprietory is to be capitalized at 800,000 pounds, as against a present combined capital of the various companies of about 2,000,000. There will be about 100,000 cash in the treasury.

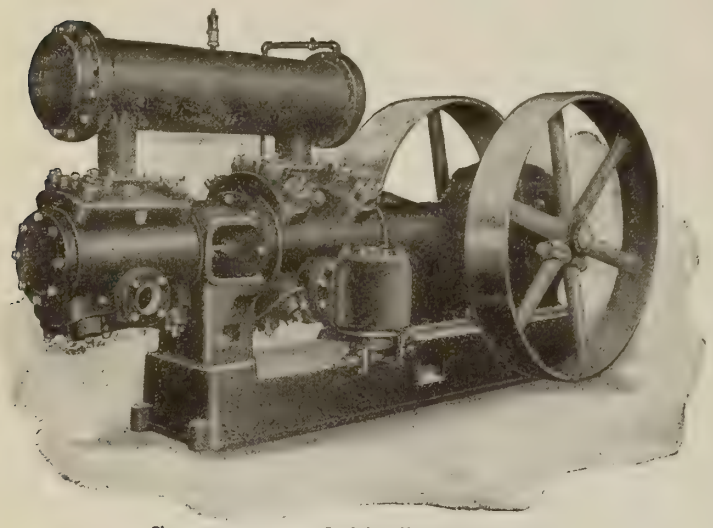
Shareholders Not Alarmed.

The labor situation in the mining fields of Northern Ontario has become more or less disquieting, following the actual declaration of a strike in the Kirkland Lake camp. At Cobalt the result of the strike vote taken last Sunday has not been made known at the time of writing. In the meantime, operations are proceeding in a normal way, and there is a tendency to view the matter as one that will be but temporary, and that the value of the mines, should actual curtailment be necessary for a time, would not deteriorate, and thus leaves no reason for panic among shareholders. The great pity, of course, is the more loyal the subject, the greater may be the hardship imposed. For instance, returned men in many instances declare that they are only beginning to "get on their feet," while many of those who did nothing for the country during the war have large bank rolls and will not suffer.

ECONOMY OF COOL INTAKE AIR FOR AIR COMPRESSORS.

Temperature plays an important part in all compressed air engineering; the intercooler exists mainly to cool the air between low and high pressure cylinders of the air compressor so that dangerous temperatures are not reached in the high pressure cylinder. In large shipyards reheaters are sometimes used to heat the air before being used in pneumatic tools; this has the double advantage of reducing trouble from "freezing," and increasing the volume of air supplied.

A simple way of increasing the over-all efficiency, and one that is not taken advantage of as much as it might be, is to place to the air compressor intake in as cool a place as possible. The cooler the intake air, the larger is the final volume of air delivered to the tool; this is realized by some, but by putting this



Canadian-Rand Air Compressor.

fact in cold figures the startling fact is brought out that every five degrees drop in the temperature of the intake air represents again in power of one per cent. For this reason the intake pipe for an air compressor should be placed so that the air is taken from outside the engine room; this is not only cooler than the air inside the engine room, but considerably cleaner. It might be thought unnecessary to insist on this point, but there are many compressor installations which show that this is not the case.

The intake pipe for an air compressor should also be made of ample diameter, at least half the diameter of the low pressure cylinder; and the longer the pipe, the larger should be the diameter. A rule given in "Compressed Air Data" is to increase the pipe diameter by one inch for every ten feet of length. The air should be taken in some distance from the grounds, say eight or ten feet above ground level.

DOME.

Toronto, June 6.

Mr. J. S. Bache, the president of the Dome Mines, and his fellow directors on that board, will leave tonight for South Porcupine, where they will examine both the Dome and Dome Extension properties preparatory to the annual meetings of these companies, which occur next week. The annual meeting of the first mentioned company is set for next Tuesday and that of the latter for the day following. Mr. Alex. Fasken, the secretary of the company, goes North along with the other officials. This is Mr. Bache's first visit to Cobalt and Porcupine.

NORTHERN ONTARIO.

The substantial reduction in the tariff as applicable to mining machinery, the greater portion of which is imported into Canada, will come as a pleasant surprise to mining interests, and will probably be all the more appreciated. Although the plea has been made on various occasions during recent years, that the precious-metal mining industry should be shielded from excessive taxation, yet very little was done in response to the plea, and the fear that the mines must survive as best they could in so far as the government was concerned, appears to have become fairly general. Now, however, a step has been taken for the benefit of the mines, or at least, such is the proposal of Finance Minister Sir Thomas White.

The Budget speech, as viewed by many representative business men of the North, has met with much approval in that it will draw most heavily upon the purse strings of the richest people in the country.

In discussing the matter with one of the men in this district who will be materially affected by the new Income Tax, the writer was informed that the government had made a step in the right direction. "It is only fair," he said, "that those fortunate enough to have won a position involving enormous income should bear the brunt of taxation." He also intimated that it was his honest opinion that this method of collecting government revenue was here to stay. "Men who are energetic, and win good fortune by denying themselves many of the pleasures of life by remaining almost constantly at work attending to the affairs of their business are certainly entitled to greater income than the men who will neglect their work and join the pleasure bent. This is a point that the government should not forget," he said. "Yet, despite this, all men who try their best do not succeed, and it is only fair that the large incomes should be severely taxed. In doing this, the government should not apply the measure to the point of confiscation for the reason that such would discourage thrift, and rob the country of the benefits won through the energy of the men of the soundest abilities."

THE CONFUSION OF INDUSTRIAL AND POLITICAL ISSUES.

The European commission of the National Industrial Conference Board (New York), which has just returned from Europe says that "solution of the world-wide unrest problem rests largely upon the separation of political and industrial issues." But is it not the aim of labor leaders to make political issues of all industrial difficulties? It is the separation of industrial issues from politics which is considered by present day labor leaders to be the weakness of the labor cause, and they show a tendency to use the massed political power of labor to adjust the most trivial industrial issues, which is indeed the whole idea behind the sympathetic strike.

THE COAL MINERS STRIKE IN CROWSNEST FIELD.

The following copy of correspondence which has passed between those concerned in the present coal miners' strike in the Crowsnest Pass Coal Field, British Columbia, and which strike now is in effect throughout District 18, fully explains the existing condition as between the men and the company:

From Gladstone Local Union, Fernie, B.C. to the Pit Bosses:

Fellow workers:—We wish to draw your attention to the fact that we are at this time engaged in a struggle to maintain the just rights of a certain portion of our membership. We think it is hardly necessary to point out to you the fairness of our demands, as you must readily realize that with the cost of living forced up to the limit, whereby it is impossible for the worker to support himself and family, it is absolutely essential that there be no reduction in wages at this time, but rather a general increase all around is needed to offset the ever-increasing cost of the necessities of life.

It has come to our notice that the coal company intend to use your services to replace those of some of our members who are out to secure a living wage.

Fellow workers, we appeal to you not to permit yourselves to be used for such a despicable purpose. We would ask you to fall in line with the fire bosses, who to a man refused to fill any job of a man who is out on strike. We realize the position they have placed themselves in by such action, and we certainly admire their courage. The members of Gladstone local union have already pledged themselves not to resume work until all fire bosses are reinstated without prejudice or discrimination on the part of the management, and are ready to take the same stand with regard to yourselves (pit bosses.) We ask you to think the matter over carefully. Is is worth while to earn yourselves the animosity and ill-feelings of all right thinking men, to pander to the wishes of those who, however much they pretend to have your interest at heart, would if it suited their purpose, take the same stand in regard to yourselves that they are taking with the ten and eleven-hour men at the present time?

(Signed) "Gladstone Local Union, per Secretary."

Reply of Pit Bosses.

In reply to the foregoing the pit bosses directed a letter to the members of the miners' union, the essential part of which reads:— "Most mine officials are holding their positions, not only through the company's choice, but by government qualification, and in the ordinary course of affairs are responsible to both parties for the safe and efficient management of their respective departments. At the present time, owing to the conditions created by a general suspension of work they are simply trying to limit the unavoidable damaging of property, upon whose welfare the city of Fernie depends for its very existence.

Should we imitate the example of the firebosses formerly employed at Coal Creek mines, who, taking a different view of the obligations inherent to their position, ceased work immediately the general strike order went into effect, we would render ourselves guilty of a very grave breach of trust and an action that all right-thinking men could not fail to consider as highly reprehensible

We might further state that at no time has the management required of the officials to do any kind of work other than that strictly covered by the Strike Clause included in the agreement still in force.

Management's Statement.

The management of the Crowsnest Pass Coal Company, Limited, have under date of May 31st, issued the following public statement:

A circular has been issued by the Gladstone Local Union to the officials of the company, urging them to stop work and assist them in getting "Justice" for certain of their fellow employees. The agreement effective in the mines of District 18 when the strike was declared, entered into between the United Mine Workers and the operators of the district, and in force under the jurisdiction and direction of the federal government through the commissioner, Mr. W. H Armstrong, director of coal mine operations, contains clauses with respect to the management of the mines, the employment of officials and the care of the mines during strikes. These clauses read as follows: —

Management of Mines.—The right to hire and discharge, the management of the mines, and the direction of the working forces are vested exclusively in the company, and the United Mine Workers shall not abridge this right; however, the company agrees not to discharge employees or refuse work of applicants on account of, or because of their affiliation with the United Mine Workers of America.

Employees Not Under Jurisdiction.—All employees connected with the management of the mine are not to be under the jurisdiction of the United Mine Workers of America, or the members thereof, and shall include the following:—

Mine.—Manager or superintendent overman or assistant overman, pit bosses, firebosses, stable boss, master mechanic, electricians, weighmen, head carpenter, head blacksmith, tipple or breaker foreman loader boss, night watchman, coke oven foreman, outside foreman and all other foremen, timekeepers, inspectors and head lampmen.

In case of either local or general suspension of mining either at the expiration of this agreement or otherwise the engineers, firemen and pumpmen shall not suspend work, but shall when mining is suspended fully protect all the companies property under their care and operate fans and pumps and lower and hoist such men and supplies as may be required to keep up steam at the companies plant, but it is understood and agreed that the company shall not ask them to hoist any coal for sale on the market.

These clauses have appeared in every agreement between the United Mine Workers and the operators of District 18 since the first agreement negotiated between them and represent the opinion of both parties that the preservation of the mines in working condition, ready for resumption of work was simply economic horse-sense and desirable as much from the point of view of the one side as the other, no matter what the dispute at the moment might be. Hitherto these clauses have been loyally lived up to and the settlement of grievances has been followed by practically immediate re-employment of all workmen.

Agreement Violated.

The circular just issued by the miners officials, however, indicates a new policy on the part of those at present in control of Gladstone Local Union. In fairness to itself the company wishes to give publicity to the fact that, in expecting its officials to remain at work for the protection of the mines, it is doing what

it has always done, and what the United Mine Workers of America have agreed it has the right to do; that those officials who have remained at work have similarly done as they have always done, and as the U. M. W. of A., have undertaken they shall have perfect freedom and right to do, and that, in taking their present attitude, Gladstone Local of the U. M. W. of A. deliberately and knowingly violates its own signed undertaking in the expectation that the added pressure resulting from a knowledge on the part of the company that its mines are suffering damages, will force settlement of their demands."

The Gold Miners Optimistic.

Leading mining men in the gold camps claim to be able to see the end of the present economic strain, and appear to believe that conditions will get back to nearly normal by the end of the current year. The labor unrest is viewed as but a temporary retarding factor, and that in due course it will be realized that the industry is bigger and better than is at present understood. It is believed that the number of men employed in Porcupine is now a little in excess of the number at the Cobalt mines.

McIntyre-Porcupine.

The development of rich ore on the McIntyre-Porcupine, now being reported in certain portions of the press, has reference to the favorable development reported some little time ago in these columns. It will be recalled that the Journal pointed out the fact that about one million dollars in new ore had been developed at and above the 800-ft. level of the McIntyre as a result of recent development work.

Strike at Kirkland Lake.

The mine workers of the Kirkland Lake camp ceased work, Thursday morning, June 12, following the presentation of certain demands which the mining companies refused to grant. Upwards of 500 men are involved in the walk-out.

The Miners' Union had demanded, as previously stated in these columns, a minimum wage of $4.50 daily to underground workers, a 44-hour week and recognition of the Union. At the time of writing, the mines in the Kirkland Lake field are closed down, it being the apparent intention of the companies to await further developments, before taking definite steps to cope with the situation and make arrangements to ultimately resume work.

MAGNESIUM SULPHATE DEPOSITS AT BASQUE, B.C.

The "Canadian Chemical Journal" contains an account by George C. Crux of a chain of lakes near Basque, B.C., from which very pure magnesium sulphate may be easily obtained in quantities not hitherto available. The lakes, as described, seem to form a series of natural evaporators. It is intimated that the salts enter the lakes from below in solution, and the crystallized salt is deposited in a circular ring around the lake in the summer. From March until June or July it is stated the deposited ring of salts is under water. In the vicinity of one lake alone, it is estimated that 6,000 tons of high grade technical magnesium sulphate is immediately available, and in one place drilling has shown pure Epsom salts to a depth of forty feet.

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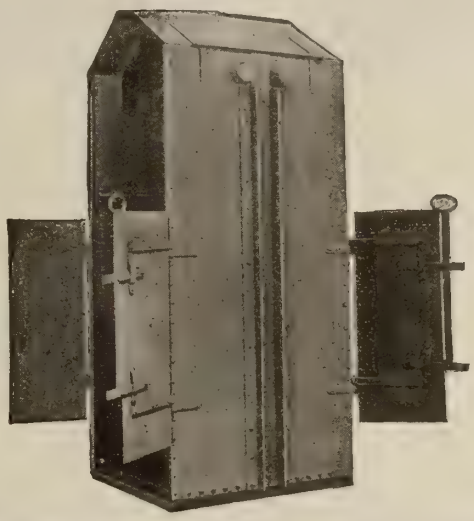

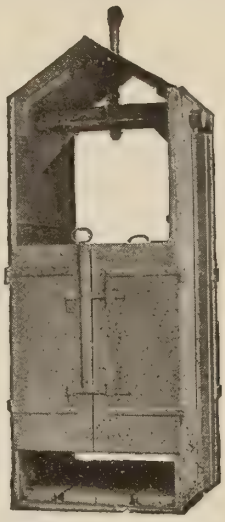

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NORTHERN ONTARIO—GENERAL.

The installation of a small mining plant on the Collins property, at Leroy Lake, in the Gowganda district, is about completed, and will be ready for operation very shortly. A shaft was formerly put down about 130 feet, with encouraging results, and it is proposed to resume work at the point where formerly left off.

A vein said to be several feet in width has been opened up on the La Bine group of claims in the Sesekinka district, in the township of Maisonville. At a point where one of the formerly discovered narrow high grade veins joins the large vein, a good deal of mineralization occurs, showing telurides of gold, as well as free gold. The resemblance of the Seseknika area bears much in common with the Boston Creek district.

A second vein has been encountered as a result of diamond drilling on the Independence Mine, at Boston Creek. About three feet of vein matter has been penetrated in the new vein. As yet the mineral content has not been determined.

With the completion of cross-cutting operations at the Dome Lake, for the purpose of opening up the ore body recently indicated by diamond drilling, it is expected very little difficulty will be experienced in keeping the Dome Lake mill running at full capacity.

It had been planned to arrange for the early resumption of work at the La Belle-Kirkland Mine, but, owing to the rather uncertain trend in the labor situation, the commencement of operations may be temporarily deferred.

ANYOX COKE OVENS TO RECOVER COAL TAR PRODUCTS.

Dr. M. E. Nichols, President of the Granby Consolidated Mining and Smelting Company recently finished a trip of inspection to the Pacific Coast.

It has been known for some time past that coke ovens were being erected at Anyox and the fact that they are now completed and ready for operation is of great interest to the industrial world and adds another important branch of the mining industry to British Columbia.

While in Vancouver, on his return from the company's Anyox plant, Dr. Nichols made the following announcement, that the heating up of the coke ovens at Anyox, which will be the first on the Pacific Coast to be operated for the recovery of toluol, benzol and the other valuable by-products of coal tar, has been started.

The armistice has taken away the necessity for the production of explosives, for which purpose the ovens were originally planned, but they will prove a valuable source of coal by-products for commercial uses. The tar will be shipped to Vancouver where the distillates will be recovered in a local works.

Dr. Nichols stated that the expensive installation of the recovery ovens was not altogether necessary, as the old beehive ovens would have suited their purpose just as well, but the war has shown that by-products would warrant the additional outlay. Formerly Germany has been by far the greatest manufacturer of dyes and other products of coal tar. These new coke ovens will now form a part of the national plans to capture this trade.

More than ever the Mill determines the profit

As the mining industry swings forward mere "rocks" become "ores." Tailings piles spring into life as "bonanzas." Ores of lower and lower grade are worked.

It is all a story of treatment methods. Reductions in treatment costs turn one time waste into "gold." More than ever the mill determines the profit.

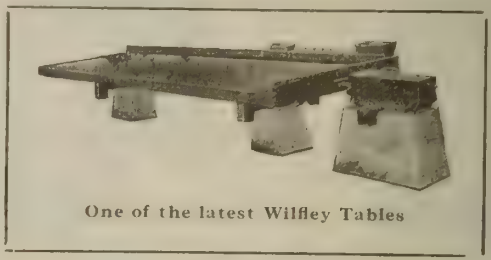
The possibilities of the Wilfley Table, the Marcy Mill and other Massco products for the mill warrant careful investigation.

Massco equipment has been making interesting changes in cost sheets.

The past few years have seen important advances in the design of mill equipment.

* * * * * *

Many improvements have been added to the Wilfley Concentrating Table—increasing its already high metallurgical and mechanical efficiency. One of the newest features of the Wilfley is a fully enclosed, self-oiling head motion of great simplicity and strength.



One of the latest Wilfley Tables

A Wilfley Table may now be obtained for concrete foundations—the steel channels are not required—strength and other mechanical advantages are retained fully.

The Wilfley Table has more than kept pace with the requirements of the times—it is a step ahead.

Have you full facts?

* * * * * *

In 1915 the Marcy Ball mill was introduced into commercial service. Its early results were revolutionary and it has since consistently given capacity that was thought impossible and costs far below the rock bottom figures set for other types of equipment.

The largest capacity ball mill plant in the world uses Marcy Mills and Marcy Mills are now grinding over 60,000 tons a day in approximately 200 plants. If you haven't the Marcy No. 42 Booklet you will certainly appreciate a copy. Just ask our nearest office.

The New 86 Marcy Ball Mill showing grates, liners and balls

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Investigate the Scobey Tailings Sampler, Pierce Amalgamator, Perfection Oil and Acid Feeder.

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:-: EDITORIAL :-:

VOCATIONAL TRAINING.

Prof. H. E. T. Haultain has resigned as Vocational Training Officer for Ontario. He has built up a splendid organization to carry on the vocational training of returned soldiers. From small beginnings there has been developed in a very short time a big institution which is effectively aiding men returned from overseas, teaching them, finding them suitable work and caring for them continuously. Prof. Haultain has been very largely responsible for the success of the work in Ontario. Many hundreds of men are given a fresh start in life by the Department of Soldiers Civil Re-establishment. Prof. Haultain has made every effort to see that the fresh start is a good one, and he is not satisfied with that. His provision of an after-care department indicates the thoroughness of the work. On another page will be found an outline of the organization of the Ontario branch. We recently visited the "plant" in Toronto, and found it a very hive of industry. The most "conservative" investigator would doubtless admit that "it's not bad—for a professor."

The several hundred members of his staff have shown their appreciation of Prof. Haultain's services by presenting him with a splendid automobile on the occasion of his return to professional work. They know better than anyone what he has accomplished, and his new car cannot be regarded as a mere machine, but rather as an expression of the admiration of a large number of men and women who have worked under his direction, and who appreciate what he has done for those returned soldiers who most need assistance on their return to civilian life.

THE REPORT ON GOLD DEPOSITS.

In the June number of "Economic Geology" there is an interesting article by Dr. Cooke of the Geological Survey of Canada on the Matachewan gold deposits. The two best known properties, the Otisse and Davidson, are described in some detail. The subject of Dr. Cooke's paper is the origin of the deposits, and his paper indicates that we have at Matachewan conditions quite different from that at Porcupine or Kirkland Lake. There are some striking similarities in all three cases; but there are also as notable differences. It takes considerable study to permit of the writing of such a paper as that of Dr. Cooke's, and he deserves our thanks for recording his observations. It might have been of greater service, however, if the paper had been published in a Canadian rather than an American journal.

We are of the opinion that it is an advantage to Canada to have information concerning our ore deposits published in foreign journals, but it seems strange that such an account of observations, made at the public expense, should be published abroad before the Geological Survey has given out in Canada any report on the area.

We have on several occasions invited the Department of Mines to utilize our columns to give out preliminary reports on areas of economic interest, examined by the Department's geologists. We have offered to co-operate, because we believe it is of more use to have incomplete reports soon after examinations are made than more exhaustive reports a year or two later. In this case there has not only been a long delay, but the information is given out first abroad.

FORGOTTEN HISTORICAL EVENTS.

Toronto "Saturday Night" under the above caption says, editorially:

"We are in danger here in Canada in following the blind lead of slap-dash American historians whose knowledge of events outside their own country is sometimes very limited. For instance, Canadian newspapers that should know better, carried a story the other day of the "Conquerors of the Atlantic" being a summary of the great feats that had been performed, and among them was the statement that the first vessel to cross the Atlantic under steam was the "Sirius," that feat having been performed in the year 1838. Now, it so happens that the first vessels to cross the Atlantic, steaming every inch of the way, was the Canadian-built "Royal William," and this feat took place in the year 1833, or five years before the "Sirius" crossed the Atlantic. Back in the year 1830, the American steamship "Savannah" crossed the Atlantic under a combination of steam and sail. In other words, she utilized her engines only a portion of the time. On the other hand, however, the old "Royal William," built in a Quebec shipyard, by a Canadian company, commanded by a Scotch-Canadian, manned by a Canadian crew, and burning Canadian coal, mined at Pictou, N.S., was the first vessel to cross the Atlantic or any other ocean, propelled all the way by steam power. If our schools do not teach such events as these they should, so that the children may at least put the old man right on Canadian historical events."

"Shipping" of New York—a weekly which we happen to know is largely energized by a Scot—says:

"The transatlantic passage by a flying machine, invented in America and operated by Americans is a fitting close to a century which began with the first transatlantic voyage by steam, also accomplished by an American-built vessel and operated by Americans."

Perhaps history will again repeat itself, and our grandchildren may be allowed to forget that the first non-stop Atlantic flight was achieved in a British-built plane by British flyers.

"Shipping" also remarks that while railway transportation "cannot be claimed as distinctly an American device, the construction of railways in the United States began only three years later than the Stockton & Darlington Railway in England, which is looked upon as the beginning of the steam railway system of the world."

We believe the Abercombie Railroad, which ran from Stellarton mines of the General Mining Association to Pictou Landing, and on which the coal for the bunkers of the 'Royal William" was doubtless carried was the first steam railroad in America, and some years ago the original steam engine was taken away to be exhibited at some United States exposition—we believe at Chicago—and never came back to Pictou County. That old engine should have remained in Canada, and should have been given as honorable a place as is given the "Rocket" in Barrow-in-Furness Station.

How many Canadians realize that the coal mines of Nova Scotia were supplying coal to Boston and New York and the "British Provinces" long before it was found that anthracite would burn, and before Pittsburg was.

It is interesting to recall that Sydney, N.S., narrowly escaped being called Pittsburg, which was the name proposed for it by Governor Desbarres.

RAILWAYS AS THE "ENTREPRENEUR" OF INDUSTRY.

Our British Columbia correspondent refers to the attention given by the President of the Canadian Pacific Railway to mines and industrial enterprises in his tour of the Western Provinces, and in doing so draws attention to one of the great functions that privately-owned railways have performed in Canada and in the United States. The Canadian Pacific Railway, we believe, has for some years maintained a Department of Natural Resources, which answers to a department that was formed in connection with some United States railways under an official known by various titles, but usually as Industrial Commissioner.

It was the business of this particular branch of railway enterprise to encourage the growth of industry along a given line of railway, to give publicity to suitable sites for factories, to spy out the land and make its possibilities widely known. While the primal incentive behind these departments was of course to create traffic and business for the railways interested, nevertheless the country in the vicinity of these enterprising railways was benefitted.

This function of a railway, so important in a new and growing country, with large undeveloped tracts within its borders, is one that can be better carried on by privately and corporately owned railways than by railways controlled and officered by Government officials, because, no matter how efficient the men appointed by a popular government, or how disinterested their motives, they cannot for long stave off the abuses of political patronage, of nepotism, of influence by populous and influential voting sections, and of the general tendency to ease in Zion that seems to descend upon all public utilities under electoral control.

The question of government control of railways versus corporate control is a live one in Canada and elsewhere today, and there are many sides to the question; but, as an *entrepreneur* of industry, we believe the government-owned railway will not prove successful, because it will not have behind it that paramount motive power of business, that primeval energiser of individual effort—personal and corporate profit. It is not fashionable in these days to express opinions in favour of monetary profits, but for what other incentive will the average man exert himself? Unrestrained individualism is responsible for many inhumanities, but in what other way has mankind found happiness but in honest work well done?—always (and here is where the average Canadian differs from the syndicalist, the communist, the Bolshevist, and all the other dreamers who wish to abolish toil, poverty and all grades of human effort, but whose finished work—if it were allowed to be accomplished—would be to degrade mankind to one drab and hopeless level of unremitting industrial slavery)—always, we repeat, for a consideration. That consideration may be larger or smaller, but if it is not forthcoming, the work will not be forthcoming either.

OIL CONCESSION CORRESPONDENCE.

In this issue of the JOURNAL will be found the text of a series of letters exchanged, first between the "Shell" Transport Company of London, and various members of the Canadian Government; and later, between the Federal Government and officers of the Provincial Government of Alberta.

In ensuing issues of the JOURNAL it is intended to publish the contents of letters exchanged between the Minister of the Interior at Ottawa, and the Toronto Branch of the Canadian Mining Institute, and further letters and telegrams exchanged between the Federal Government and the Alberta Government and oil companies already established and operating in Alberta and in Eastern Canada.

The correspondence is lengthy, but not tedious, and seeing that it concerns a request made to the Government of Canada for a reserve of 250,000 square miles of territory and a subsequent choice therefrom of 25,000 square miles, we believe it will interest most of our readers.

STORAGE BATTERY LOCOMOTIVES FOR MINING PURPOSES.

Present day labor conditions, accompanied by correspondingly high cost of unskilled labor, has made it imperative that mine managers consider the application of modern haulage machinery. In the past, mines with a limited output, and only moderate length of hauls could not give serious consideration to the heavy trolley type of locomotive, since their operations would not warrant such expenditure and it has therefore been necessary to resort to the primitive method of moving ore cars by hand. With the development of hydro-electric power throughout the Dominion, with its correspondingly low cost and flexibility, attention is

(Continued on Page 464.)

Nanaimo Meeting Western Branch, C.M.I.

(From our British Columbia Correspondent.)

A number of addresses dealing with mining matters of special interest in the Pacific Northwest, notable among which was one by Major A. W. Davies on "Tunneling at the Front"; the formation of a Coal Mining Section, the membership of which includes Vancouver Island and the Nicola Valley Coal Fields; and the election of officers were noteworthy events in connection with the annual meeting of the Western Branch of the Canadian Mining Institute held at Nanaimo, B.C., on June 4th and 5th. Some fifty delegates were present, all of whom were of Vancouver Island, with not more than three or four exceptions, this being explained by the fact that transportation facilities with the Mainland were dislocated by a strike of steamboat men. The Metalliferous Branch of the Industry also was marked by its lack of representation, although four of the addresses presented were of special interest to men of that section.

In the absence of R. H. Stewart, E.M., who is in Texas on professional business, W. M. Brewer, Government Mining Engineer, Nanaimo, B.C., occupied the chair. After his introductory remarks the election of officers for the new year was taken up with the following results:

Chairman, E. E. Campbell, Superintendent of Mines, Anyox, Granby Consolidated Mining & Smelting Co.; Vice-Chairman, Prof. J. M. Turnbull, of the University of British Columbia; Councillors, Wm. Fleet Robertson, Provincial Mineralogist; W. M. Archibald, Mine Manager, Canadian Consolidated Mining & Smelting Co.; Major R. W. Brock, University of British Columbia; Thos. Graham, General Superintendent of the Canadian Collieries (D), Ltd.; Major A. W. Davies, Superintendent of the Taylor Mines Co., which has taken over the Dolly Varden Mines, Alic Arm, B.C.; James Buchanan, of Trail, B.C.; A. G. Larsen, Spokane, Wn.; Charles Camsell, of the Geological Survey Branch, Ottawa, with headquarters at Vancouver, B.C.; Henry Lee, of the Britannia Mining Co.; R. R. Bruce, Paradise Mine, Windermere, B.C.; C. M. Campbell, Granby Consolidated Mining & Smelting Co.; A. G. Langley, Resident Mining Engineer, Revelstoke, B.C.

Coal Mining Section Formed.

The Coal Mining Section, to which reference has been made, then was proceeded with, and its organisation makes the third such body formed within the membership of the Canadian Mining Institute, the two others being in Nova Scotia and in Alberta and Eastern British Columbia, the latter being known as the Rocky Mountain Section. The idea is to give coal mine operators and miners an opportunity to devote independent and special attention to the problems relating to their industry. The officers selected for the Western Section follow: Chairman, George Wilkinson, Chief Inspector of Mines; Secretary and Editor, James Hargreaves, Instructor of Mine Work in connection with the Provincial Educational Dept.; Council: John Hunt, General Superintendent of the Canadian Western Fuel Company; Thos. Taylor, Pacific Coast Coal Mines, Ltd.; R. R. Wilson, Manager Granby Consolidated Coal Mining Company, Cassidy's; Francis Glover, Mine Manager, Princeton Coal Mining Co.; Charles Graham, District Superintendent Comox Colliery, Canadian Collieries (D), Ltd.

Eight papers were read, four at the afternoon and the same number at the evening session. The former are of interest to the metalliferous mining man, while the others deal with matters of particular concern to the coal miner. The latter are "Notes on Coal Mine Air Sampling," by Dudley Michel, Instructor in First Aid and Mine Rescue Work, Department of Mines; "Techincal Education and its Relation to Coal Mining," by James Hargreaves; "Regrading Slopes, No. 4 Mine, Cumberland, B.C.," by Charles Graham; and "Development and Operation of Mine Rescue Apparatus," by H. H. Sanderson, of Seattle, Wn.

An inspection of the coal mine plant of the Granby Consolidated Mining & Smelting by the delegates; a demonstration of the Gibbs and Paul Rescue Apparatus by teams representing the miners of Ladysmith and Nanaimo; and a smoking concert in the evening concluded the programme.

Chairman R. H. Stewart's Address (by proxy).

As I shall be, unfortunately, unable to be present at your meeting at Nanaimo and there are a number of matters which have been under discussion during the past few months which should be brought to your attention, I am forwarding this letter to your secretary with the request that he place it before the meeting.

The Council of the Canadian Mining Institute and the general meeting in Montreal have passed certain resolutions and proposed amendments to the by-laws of the Institute, which are now being referred to the members to be voted on, and for which you have doubtless received printed ballot forms. I refer to them in more detail below:

Amendments relating to the election of Council and Vice-Presidents.

This amendment is proposed in order that representation of the various provinces on the Council may be more evenly divided and that members elected to represent each province may be more truly representative of that province.

The present method of election is such that a councillor representing British Columbia is probably elected by the votes of members in Ontario or Quebec, most of whom may not even know him. The proposed method of election will make the councillors more truly representative of the Branches from which they come.

The Dominion is so large and the interests of the Provinces so varied that this arrangement seems very advisable.

Change of Name of the Institute.—The reasons for which this change is advocated are those which caused the change of name of the American Institute and the proposed change follows the lead of the American Institute. It is felt that the profession of metallurgy is so closely interwoven with that of mining, and members of both professions have so many interests in common that the Institute should embrace both, and as members of the metallurgical profession have in some instances felt that the C.M.I. was only a Mining Insti-

tute and that they were not mining engineers, they have not joined. The change of name is intended to make it clear that metallurgists are to be included.

Amendments re Membership Requirements.

It has been stated by certain members of the Engineering Institute of Canada that the C.M.I. was merely a trade organization and had no standing as a professional institute. While it is true that some of the members of the Institute are not engaged professionally in mining or metallurgy, the greater majority are so engaged and the amendments to the membership requirements have been designed to make this point more clear.

While the division between professional and ordinary members seems to be unnecessary and almost unfortunate, as there is no real distinction in so far as control of the actions of the Institute are concerned, both classes having the same rights and privileges; yet, in view of the remainder of the by-law, it would seem advisable that it be voted for in order that necessary changes be not delayed.

In view of the great extent of the Dominion and the differing interests of the various provinces, it is very advisable that the Provincial Branches be strengthened, and that they in turn be kept in closer touch with the parent Institute. Part of this is accomplished by the amendment to the by-law re. election of councillors. There remain other things to be done, and some of these have been under consideration by the Council.

Although the provinces are properly represented on the Council, distances are so great that it is impossible for Western Councillors to attend meeting at headquarters and matters can be passed only by Council meetings in Montreal, at which only eastern members are present. It would seem that outside of routine matters, all matters of general interest should be referred by letter or wire to all councillors for approval before being acted on and this if not already so, should be one of the by-laws of the Institute.

Besides the Council, there should be more definite connection between the Secretaries of the Institute and the Branch Secretaries and in a province like ours more definite connection between the Branch Secretary and the Branch Council and members. This, on account of distances between the Branch Councillors and members can only be accomplished by very considerable correspondence. It is necessary, therefore, that there should be a secretary who is paid by the Institute to give at least part of his time to this work. It is hardly fair to ask that a busy member give it voluntarily, and the thanks of the Branch are due to Mr. Wilkinson who has done so during the past year.

The council of the Institute have aproved the principle that the Secretaries of at least the Western Branches should be paid, and it is hardly necessary to point out to you the necessity and advantage to your branch of such a move. It is advisable that you send by wire to Montreal recommendations as to the amount to be paid and the name of the secretary who will be selected by the new Council.

The council of the Institute have approved the printion of paying the expenses of one member of the Council from each of the distant provinces to at least one meeting yearly at headquarters.

The above changes should be of great advantage to the Western Branch, but there remains much to be done to stimulate interest in the Western Branch.

It has been proposed that owing to the difficulty on account of the distances between the mining districts of the country, local branches be formed at important points, which will bring members in those districts together. Such branches are already in contemplation at Nelson and Nanaimo.

One of our active Kootenay members has suggested that in the Western Branch too little attention has been paid to the social side of our meetings. One of the main purposes served by the meetings is that of bringing members together and getting them acquainted. For this reason he believes that we should give more attention to this end of our meetings.

Some of the eastern branches hold informal monthly luncheons at which matters of interest may be discussed. Something of the kind might easily be organized in some of our B.C. centres.

A Committee of the American Institute has been formed for the purpose of further co-operation with the Canadian Institute and partly with this end in view it is proposed to hold a joint meeting of the Institutes at Nelson during the Convention there on June 19th—21st. It is to be hoped that many of the Western Branch members will be present.

It has been suggested that it would be possible to hold a general meeting of the Institute in the West once a year in addition to the Annual Meeting held in Montreal, which would enable western members to attend some of the general meetings of the Institute. This would appear to be feasible and of advantage to the Institute and its members. Would it be possible to hold such a meeting in Vancouver or Victoria, say about November 1st? This might be held jointly with Western Sections of the A.I.M.M.E. Your meeting might consider this question, and if thought advisable, make a recommendation regarding it to the Council of the Institute.

The Council of the Institute has made recommendations to the Dominion Government with regard to increasing the pay of technical men in Government service. It is well known that while the Government has very able technical men in its employ, notably in the Geological Survey and Department of Mines, the salaries paid are such that men are continually leaving them. No one can over-estimate the importance to the country of capable technical men in these departments or the necessity for their being properly paid. I believe your meeting will be prepared to endorse the recommendations of the Council.

A tentative scheme for the employment of returned soldiers in prospecting has been recommended to the Dominion Government. Details have not been worked out and probably had better be worked out by returned men themselves, amongst whom are many of our best prospectors, mineral and mining engineers. If such a scheme can be successfully organised and carried out, it might be of immense value to the province and to the Dominion at large.

In conclusion, you have my best wishes for a successful and interesting meeting and for a successful year for the Branch.

Vancouver International Mining Convention at Nelson.

The Vancouver Board of Trade will be represented by Messrs. Nichol Thompson, A. Erskine Smigh and Wm. Godfrey. The Vancouver Chamber of Mines by Messrs. A. M. Whiteside, Dr. Edwin T. Hodge, R. S. Lennie, Robt. C. Sweatt.

The Prospector and the Mineral Industry

By J. C. GWILLIM.

During the last year or so there has been some concern for the encouragement of prospecting in Canada. There has been a fear that unless prospecting is stimulated the mineral industry will decline. No new camps of great merit have been found in British Columbia for the last ten years. Some large producers, here and there, have become great mines, e.g., the Sullivan lead-silver-zinc mine of East Kootenay; the Britannia Copper Mine of Howe Sound; the Anyox Hidden Creek mines of Alice Arm; and the Surf Inlet gold mine of the same coast.

Within the last thirty years, 1888 to 1918, there have been several great impulses to prospecting, with the making of highly productive mining camps. In the order of their discovery, these are: The Sudbury copper-nickel deposits; The West Kootenay silver-lead, and gold-copper deposits; the Yukon placers, and the Cobalt and Porcupine silver and gold deposits. At the present time the districts of most promise are the pre-Cambrian areas of Northern Quebec, Northern Ontario, Northern Manitoba and Saskatchewan; all more or less wooded, rocky tracts of country intersected by water routes; and the flanks of the great coast granite batholith northwestwards from Vancouver.

There are still a good many prospectors, or adventurers of other kinds, who may chance upon a new mining camp. Prospectors breed fast after a chance discovery, such as the Murray mine outcrop of Sudbury; the Silver King of West Kootenay; the La Rose or McKinley-Darragh of Cobalt; and the Britannia of the British Columbia Coast. Not one of these camp makers was first found by a prospector of the vocational type. When, by chance, or by design, another camp maker is found, as it surely will be, there will be no lack of quickly appearing prospectors to search the adjacent and other districts. Some one may object to this variety of prospector, but a little enquiry will show that their winnings have been considerable, for prospector "aces" are uncommon; the life-long prospector may find less in any given time than one of these.

The mineral production of Canada, according to statistics, has increased from $12,518,894 in 1888 to $210,204,970 in 1918. Thirty years ago the metallic minerals produced were less than one-third of the total. Ten years ago metallic and non-metallic production was nearly equal, and in 1915 the metallics overtook the non-metallics, and structural materials. This was probably due to war demands; otherwise a great agricultural and industrial country is likely to produce a greater value of non-metallic minerals. During this period of thirty years the per capita production increased from $2.67 to about $25.00.

Prior to 1888, prospecting as a vocation was little followed in Canada, if we except the placer miners of British Columbia and a few casuals of Nova Scotia, Quebec and Ontario, who were searching for gold, copper, asbestos, rock phosphate, and nickel ores, in the back lots of these provinces. There was, however, a movement of prospectors along the north shore of the Great Lakes towards the silver area of Thunder Bay, and the gold occurrences of the Lake of the Woods.

Yet Canada, in its earliest history, was looked upon as a mineral country by those adventurers who examined the coasts of Newfoundland, Labrador, the islands of Hudson's Bay, and the north shores of the Great Lakes. I do not know the early history of gold discoveries in Nova Scotia or of copper and rock phosphate in Quebec; but the asbestos of Thetford, and the copper-nickel of Sudbury, were not discoveries made by vocational prospectors, and it is probable that the prospector of those days was a lumberman, a fisherman, trapper, hunter or backwoods settler, who did not wander far from his base in a direct search for minerals.

The more modern type of prospector appeared in Canada about 1885 to 1890, at a time when gold was coming from the Nova Scotia Anticlines, and the British Columbia placers of Cariboo, Omenica and Cassiar, in nearly equal quantities; silver from Port Arthur in Ontario, and from an unknown source in Quebec. Also in nearly equal quantities—195,580 ounces from Ontario and 149,388 ounces from Quebec. Copper then came almost entirely from Quebec, for Sudbury was only beginning its great production of copper-nickel. Lead, as now, came from British Columbia, but not from the Kootenay mines, for they were yet undiscovered. Pyrites had made a good start—63,479 tons in 1888. Rock phosphate was going strong in Quebec and Eastern Ontario. Manganese, in Nova Scotia and New Brunswick, was at its peak production, 1,801 tons. Zinc, cobalt and nickel, in 1888, were not produced in commercial quantities.

At this time Thetford asbestos and Sudbury nickel-copper fields were, so to speak, on the bottle—not known to be rare young giants—Rossland, Slocan, Boundary Creek, Klondike, Cobalt and Porcupine, were as Nature made them. These were not back lots, they were parts of the virgin wilderness; they were discovered more than less by luck and chance, but they were prospected by men who made a business of prospecting.

In 1889 the western mountains and coast contained many adventurous men, such as had followed the construction of the Great Northern and Canadian Pacific railways. There were also many who had followed mining or prospecting in the Western States—Montana, Colorado and Idaho.

When the Hall brothers, of Colville, on the Columbia, found the "Silver King" outcrop on Toad Mountain, near Nelson, while searching for lost horses, they started a prospecting movement which overran Southern British Columbia for the next ten years.

A year later, in 1890, Bourgeois and Morin staked on Rossland Red Mountain, and the following year Eli Carpenter came back to Ainsworth with high grade silver-lead ore from the Slocan. These, with discoveries of Boundary Creek, were all the beginnings of famous camps, which attracted "Mining Men" from many other fields, but chiefly from the Western Mining States; men who followed a mining boom as others follow a real estate boom. The country was alive with prospectors, promoters, mining experts and parasites, of a Western mining boom; mostly Western Americans at first. Sometimes a prospector staked and developed a "grass roots" property,

taking pay ore from the outcrop down; but the usual sequence of events was to option or bond the discovery to some mining man, who found the people who were ready to prove the property during a term of development. If things looked well, payments were made from time to time. Thus the prospector and the purchaser shared in the results of work done. This left the prospector free to follow his own line, or spend his payments, as he pleased, but kept him in the district watching developments.

The Western American method of bonding claims at a moderate figure, with payments as development warranted, has less risk than the cash payment for prospects. Often very large sums, made in Northern Ontario during the early days of Cobalt, Gowganda and Porcupine. Some of these won out in those districts, but they were great risks and a menace to good mining. Only good fortune was invoked when a large cash payment was made on pure prospects.

The prospector of the golden age in Southern British Columbia, was seldom a paid man. He went alone, or shared with partners, or was grub-staked for half share by someone who was ready to find him while in the hills and pay for his assays and other expenses on his return. The mountains were all crown lands; or if not he had the right of way, for British Columbia, mindful of its early gold hunting days, gives the prospector a pretty clear field. He can stake his ground in any direction and almost any place; but cannot overlap a prior location. Three stakes in a more or less straight line orient and define his boundaries.

The prospector of this period, 1889 to 1899, rarely made much but a living; some made fair "stakes," which were usually soon spent in the vicinity, not carried away and salted down. The great majority sold or bonded for small sums, worked in the mines when they were hard up, or got a grub-stake to carry on. The complexion of mining at this time was American. There were men from Butte, Spokane, Seattle, and the Coeur d'Alene of Idaho, with a scattering of Canadians from Alberta, where times were dull, and from the many drifters of British Columbia, who had wandered westwards and could go no further for the sea—an unstable element ready to follow new developments.

By 1898, much of Southern British Columbia had been run over by prospectors. No new camps were being found. The day of quick transfers was over. Production increased. Many went into the mines or clung to their pet claims; the rest were very ready for the great rush to Klondike in 1898 and 1899.

There was a ditty at this time in the minds of those who stayed behind to this effect:

"Kootenay was Kootenay when Klondike was a pup.
And Kootenay will be Kootenay still when Klondike's busted up."

The 30,000 men who went to Klondike in 1898 were a very mixed lot. Nothing much might be expected of most of them in the way of new discoveries; but there were many good prospectors also, some of whom traversed the country en route by way of the Edmonton, Ashcroft and Telegraph or Taku-Teslin trails. From all the host which traversed that north country and slowly filtered out again, much might have been expected, but the results were singularly small: a few small placer areas, and some lode mines at Windy Arm, Atlin, Wheaton River, White Horse, and White River. None of these, except the White Horse copper deposits, show much activity at the present time.

After a subsidence of British Columbia and Yukon booms, which had helped to bring the annual production up to $60,000,000, prospecting fell away. It was a period of prosperity and few men were adrift. Then, by another of those "Adventitious" discoveries in 1903, prospecting broke out afresh in a most unexpected place and Cobalt came to fame. All the rock cuts of British Columbia railways, as far as I know, never disclosed a valuable ore-body, or new camp, like the Murray mine outcrop west of Sudbury, or the La Rose of Cobalt. The Monarch Mine at Field and the Lanark, each of Revelstoke, may have been found during construction of the C. P. Ry.; but in other cases the railway followed the prospector, did not precede him.

Cobalt developed a different type of prospector. It is a country of low relief, woods, rocks, bogs, and water ways. To the Western man it had little romance; he was used to long views, and visible outcrops or float from them. The narrow streaks of ore; the covered surface; and the trenching for a discovery in the fly-plagued woods of Northern Ontario did not much attract him. Still, the reward in Cobalt camp, to the prospector, was unusual. One has to search for the men who made a stake and kept it in most camps; but Cobalt made a competency for many of its original prospectors, and their associates.

The Cobalt discoveries caused another long period of prospecting. There spread out into Northern Ontario and Quebec a host of adventurers, who found the lakes, rivers, woods and rocks as attractive and as hopeful as their Western brethren find the mountain. The canoe and tump-line became to them what the pack-horse and diamond-hitch is to the Western variety, and with these they have penetrated to many far away places. The names and stakes of some of them may be found along the edge of Labrador, 400 miles north of Quebec, and some are still searching pre-Cambrian areas, from Quebec to Churchill river, across the Northern portions of four provinces.

Porcupine gold camp is the latest of the great discoveries. Gold mining in Ontario had previously been disappointing. It needed courage to pay large cash sums for gold prospects; but it was done, and followed up by sufficient development, which has often proved the making of a mine. Otherwise Porcupine might have shared the fate of the earlier gold mining camps of Ontario. Since the discovery of Porcupine, there have been many new calls to the prospector, none of which, excepting, perhaps the "Pas" of Northern Saskatchewan, is a history maker. There have been some good ore-bodies found or developed in places far apart, without creating a prospecting boom.

The Portland Canal rush filled that country with prospectors, but did not make good at that time. Now it looks as if there might be a return to that and adjacent districts, caused by good results on Salmon river, Alice Arm, and the proved mineralization of rocks, associated with the coast range granite.

Considering, then, the record of new camps within the last thirty years, and the large areas yet potential, for such, it seems that other camps will appear, and the prospector wil not die out, for there are always masterless men, who prefer to follow luck, chance, and the wilderness to the restraint of other occupations.

Haileybury Mining School

Mr. Cody, Minister of Education, at Formal Opening.

At the formal opening of the Haileybury Mining School, held recently, Hon. H. J. Cody, Minister of Education for Ontario, made the definite offer to do all in his power to secure the necessary financial aid to make the School one of the most up-to-date and efficient institutions of its kind in Canada. With regard to the various courses in connection with mining, the Minister stated that in so far as the returned soldiers are concerned, if the School Board and all concerned with the welfare of the School will unite and successfully impress upon the Federal Government the importance of the work and thus induce the Dominion Government to pay the cost of personal maintenance, amounting to $70 or $80 per man, he made the definite offer that the balance of the expense, which would include the upkeep of the school and equipment, and the payment of salaries to the teaching staff, would be taken care of by the Department of Education of Ontario.

The chairman, George T. Smith, paid fitting tribute to the invaluable work of the advisory board, consisting of leading mining men of the Cobalt camp, namely, F. D. Reid, M. F. Fairlie and J. Deny, the first named being chairman. He also took occasion to refer to the unremitting efforts of the principal, W. A. Wilson, without whose efforts the school could not have achieved its present measure of success.

The first speaker was Capt. Thos. McGladery, who, as M.P.P. for this district, welcomed the Minister of Education to Tesimkaming. Capt. McGladery was folowed by N. J. MacAulay, Mayor of Haileybury, who drew attention to the fact that the present was not only the first visit of Hon. H. J. Cody to this part of Northern Ontario, but it was the first formal visit of any Minister of Education.

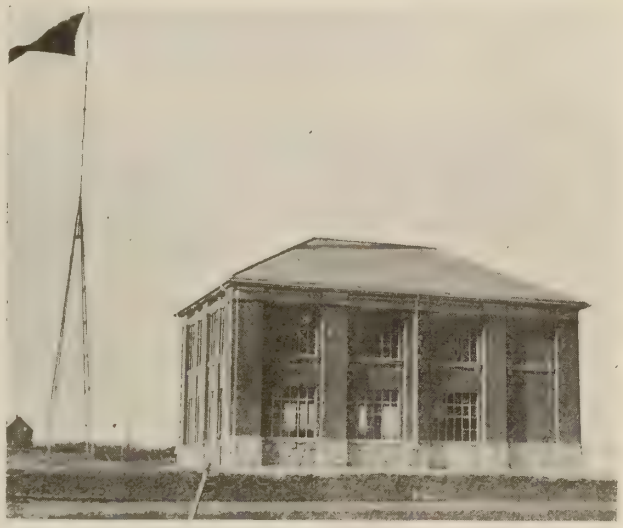
Hon. H. J. Cody's Address.

In opening his address, the Minister declared the Haileybury Mining School "well and truly opened," and stated that in so far as the school had been in operation some little time before this, his official visit, he was of opinion that the present was more in the nature of a benediction rather than an initiation.

The speaker referred to the fact that from this country had gone forward a body of men to fight a common enemy, and "whose suffering and service had purchased afresh this great heritage." He told of his previous impression of Northern Ontario being a wedge of rock extending away into the sub-Arctic, valuable alone for its great mineral wealth. The present visit, he said, had been a revelation, and that as he looked out over the vast sweep of territory, over the beauty of two million acres of agricultural lands, at the beauty and the fertility on surface and visioned the untold wealth below, the sight and the thought spelled out the magnitude of the North.

Optimism, said the Minister, appeared to be characteristic of every man in Northern Ontario. The discovery of the great silver mines of Cobalt a few years ago had marked the re-birth of Ontario, and, followed by the discovery of great gold mines further north and the gradual development of the wide sweep of agricultural lands had marked the north as the Greater Ontario. He referred briefly to a visit to the prairie provinces of the Canadian West when in their early stages of development, and in illustrating the spirit of optimism which held sway there at that time, he mentioned a visitor from the East having said that "Every knoll was a mountain, every rill a river, and every man a liar."

Hon. Dr. Cody touched briefly upon the present wave of industrial unrest, the necessity for patience and co-operation, and stated that it would be tragic for the wheels of Canadian commerce to be clogged at this time, by what in some instances looked like some malign influence at work. He told of the work of the Canadians in Europe, of how at the eleventh hour of the eleventh day of the eleventh month of 1918 the Canadian Corp had struck the final blow in the war in the capture of historic Mons, and that it would be a great pity to lessen the advantages of victory by lack of harmony.



Ore-testing Laboratory, Haileybury Mining School.

Haileybury's Fine Educational Record.

The Minister emphasized the supreme importance of education in a nation, of how the Haileybury Mining School was providing means whereby men could learn to specialize in a manner that would directly fit them for their life work, and that in this respect the North had led the way. The Haileybury High School started nine years ago, with a handful of pupils in a rented building. Six years ago the present school was started. And now, has come the addition of a mining department.

Comparing a secondary school of this nature with the Technical Colleges in other parts of the country, Hon. Dr. Cody declared: "I venture to think the kind of training here would fit the men for the particular work in much shorter time than in any other way."

J. A. McRAE.

SILVER OUTPUT—NORTHERN ONTARIO.

Estimate of 1919 Production.

The output of silver from the mines of Northern Ontario for the first half of 1919 has approximated 7,000,000 ounces. This would appear to indicate a total output of about 14,000,000 ounces for the whole year. So far during the year the price of silver has averaged about $1.03 per ounce. Since the removal of the fixed maximum price, however, a steady increase in quotations has taken place, and by the end of the year it would not be a surprise to metal authorities were the average for the year to amount to

abount $1.10 per ounce. Thus, with these figures as a basis of calculation, it would appear reasonable to expect the value of the 1919 production to amount to about $15,400,000. Compared with 1918 it would indicate a decline of about $2,000,000, but compared with 1916 would show an increase of over $2.000.000, and compared with 1911 would show an increase of upwards of $3,500,000.

During the fifteen years beginnig with 1904 and ending with 1918, the silver output amounted to $169,-241,387, or an annual average of $11,282,759. During the fifteen year period under review a total of 292,-056,976 ounces of silver was produced, or an average of about 19,470,564 ounces annually. Thus, although in point of ounces produced, the indicated 1919 output is considerably below the average, yet the increased price in quotations for the white metal makes the value of the output well above the average. With the probability of still further increases in the quotations for commercial bar-silver the Cobalt camp may be expected to hold its own for considerable time to come.

Following is a table which shows the average price of silver, the number of ounces of silver produced and the value of the output since the Cobalt camp came into being. The 1919 figures are obviously estimates:

	Av. price Cts. per Oz.	Ounces.	Value $.
1904	57.2	206,875	111,887
1905	60.4	2,451,356	1,360,508
1906	66.8	5,401,766	3,667,551
1907	67.5	10,023,311	6,155,391
1908	52.9	19,437,875	9,133,378
1909	51.5	25,897,825	12,461,576
1910	53.5	30,645,181	15,478,047
1911	53.3	31,507,791	15,953,847
1912	60.8	30,243,859	17,408,935
1913	57.8	29,681,975	16,553,981
1914	54.8	25,162,841	12,765,461
1915	49.69	24,746,534	12,135,816
1916	65.661	19,915,090	12,643,175
1917	81.417	19,401,893	16,131,013
1918	96.772	17,332,804	17,290,826
1919 (1st half)	103	7,000,000	7,210,000
Totals	.....	299,056,976	176,451,387

J. A. McRAE.

LABOR AND WAGES — KIRKLAND LAKE AND COBALT.

(From Our Northern Ontario Correspondent.)

After having learned that the members of the Miners' Union at Kirkland Lake called a strike without the sanction of the district executive, and after learning that one of the district officers had gone to Kirkland Lake for the purpose of endeavoring to bring about some sort of a settlement and induce the men to return to work, the journal correspondent took occasion to look into the situation carefully.

It is learned that the Union has addressed an appeal to the mine managers of Kirkland Lake, asking for another meeting on Thursday night, June 19. To this the mine managers have agreed. It is a peculiar fact, however, that even should the mine workers offer to return to work at the wages and on the conditions which formerly obtained, the mining companies are not prepared to take them back. The mine workers, they declare, were given every possible consideration, and were being paid wages that threatened the very existence of the gold mines of the camp, yet despite every effort to convince the men of this fact they proved untrustworthy to the companies for which they worked and demand that all men should cease work in those mines. Already a good deal of loss has resulted, and the mines having been forced to go to the expense of closing down, appear to have decided to remain closed for the summer and are confident that in the meantime the cost of producing gold will decline sufficiently to pay for the enforced idleness.

Mines Closing Down.

The Lake Shore, the leading producing gold mine in the Kirkland Lake camp during the past year, and paying interim dividends of about 2⅛ p.c. quarterly has not only closed down tight, but taken the pumps out and is letting the mine flood with water. Already the 400-ft. or lower level of the mine is said to be filled, the water having risen to within 375 feet of surface. The Tough-Oakes, the Wright-Hargreaves, Teck-Hughes, Kirkland Lake, Elliot-Kirkland, etc., have also all closed down with the intention of not opening until men may be employed at a rate that will leave a reasonable margin of profit to make it worth while to conduct mining operations.

In spite of this situation the union has asked for another conference and the mine managers have shown their usual courtesy in agreeing to meet the men in open discussion. However, as stated above, the mine managers consider the drastic action of the men as a breach of trust, and are not expected to again offer the same workers even the opportunity of re-employment, as it would again place the already heavily burdened gold mines at the mercy of the body which even now constitute the strikers.

Kirkland Lake Strikers Agitating Cobalt.

In the Cobalt camp quite a number of the most radical of the Kirkland Lake strikers have put in their appearance and appear to be endeavoring to enlist the sympathy and to incite the mine workers of Cobalt to strike in support of the action taken at Kirkland Lake. Meantime, as stated in Monday's "Globe," the Union here has agreed to not take any drastic action until Senator Robertson returns to Ottawa from Winnipeg.

Cobalt Managers Prepared to Close Mines.

The managers of the Cobalt mines have already made arrangements to close down should the demands of the union be pressed to the point of calling a strike. It is contended that wages are higher and conditions are equal to any other metal mining camp in the world. It is pointed out that in the Western United States wages have recently been reduced about $1 per shift. Also it is learned on good authority that in the Sudbury district a large number of miners are now actually out of work and seeking employment for only two or three days a week where or whenever possible. Were the Cobalt mines to close it is not improbable that curtailment would last until such time as new forces became obtainable, and that it might be found necessary to discontinue the payment of a bonus on the high price of silver at least until such time as the mines could recoup the loss incurred during the period of enforced idleness.

Under such conditions, therefore, and taking into consideration the fact that the suspension of precious-metal mining for a time would not cause more than local hardship, being in this respect different to coal mining, it would appear, after a careful review of the situation, that the Union will have everything to lose should they decide to strike.

Special Correspondence

NORTHERN ONTARIO.

Trethewey-Cobalt, Castle Property.

Shareholders of the Traethewey Cobalt Mining Company are enthusiastic over results being encountered on the Castle property in the Gowganda district. The shaft has reached a depth of 380 feet at the time of writing, and will be carried to the 400-ft. level where lateral work will be done for the purpose of opening up the vein system found at the 300-ft. level. The Castle property lies adjacent to the Miller Lake-O'Brien mine, and the geological conditions are very similar. This indicates excellent prospects for the Castle.

More courage is required to conduct mining operations in the Gowganda field than was the case in the early days of Cobalt, Porcupine and Kirkland Lake for the reason that even at the leading mine several year's work was done before encountering silver deposits of material of commercial value. The knowledge gathered as a result of the development of the Miller Lake-O'Brien mine, which is producing upwards of one million dollars a year, has made the exploration and the development of other neighboring properties less problematical, in that the geological structure has been proven to be less favorable for the deposition of silver in commercial quantities.

The terms under which the option is held gives the Trethewey stock in the Castle company in payment for money spent in developing the latter. This holds gold only up to a point where the Trethewey shall acquire fifty-one per cent. of the Castle stock. As to whether or not the remaining forty-nine per cent. is to be left in private hands or is held under option at some stated cash price has not been learned at the time of writing.

Beaver Lake—South Lorrain.

Properties situated in the South Lorrain silver area continue to attract attention. It is learned that British interests are now negotiating for the Beaver Lake property, situated adjacent to the old Keeley mine.

The Beaver Lake is owned by Messrs. J. M. Wood, Mr. Loney, Robert Jowsey, and Chas. Keeley, all of Toronto. Several years ago the property was explored in an aggressive way, a good deal of encouragement being met with. A considerable amount of low grade ore was opened up, and a number of veins uncovered in which a large amount of cobalt and encouraging silver values were found to occur.

New Uses for Cobalt Mineral.

It is understood that big interests are in the field, quietly endeavoring to secure mining properties in this district on which Cobalt minerals occurs in commercial quantities. It has been learned that "Stellite" (a high grade steel in the manufacture of which cobalt plays an important part is to be used extensively in the manufacture of automobiles in Great Britain. Not only has "Stellite" proved highly efficient in the manufacture of tool steel and in automobile construction, but it has been found to last indefinitely without tarnishing, and for this reason will probably be extensively used for purposes of decoration, replacing brass and nickel.

Much speculation is rife among certain of the mining men of the Cobalt district where cobalt mineral is found to occur in greater quantities than in any other part of the world. A few years ago its use appeared to be confined almost entirely to the china manufacturing industry in which it was used for coloring purposes. Should the use of the mineral really become extensive, added value will perhaps accrue to not a few of the silver mines of Cobalt, where, during the course of mining silver, a considerable amount of cobalt is mined. Also, a large number of outlying properties are known to have substantial deposits of cobalt.

Gold Occurrence Near Swastika.

A party of Dominion government geologists are engaged in field work in the townships of Eby and Otto, in the vicinity of Swastika, on the west side of the T. & N. O. Ry.

Recent prospect work in this area has resulted in the discovery of what has the appearance of being a possible important discovery of gold.

Catherine Gold Mines Co., Boston Creek.

The Catherine Gold Mines Company, Limited, a newly organized concern, has made arrangements to carry on comprehensive exploration and development campaign on property situated in the township of Catherine in the Boston Creek district. A force of men has already been engaged, the work of constructing camp buildings have been completed and surface trenching started.

Goldfields Consolidated—Larder Lake.

Diamond drilling is to be done on the Kerr-Addison property of the Goldfields Consolidated Company, in the Larder Lake area. According to official information the surface showings on the property are such as would offer every inducement to carry out an extensive exploration program with very satisfactory prospects of proving a large body of commercial ore.

A good deal of criticism is heard among mining men relative to the apparent failure of the Goldfields to venture an estimate as to how much commercial ore has been proven on their property, showing the number of tons and the average grade. In view of the fact that about three quarters of a million dollars has been spent on the property, it is thought a detailed report made out along the generally recognized lines would throw much light on the outlook. It has been pointed out that the Goldfields appears to be desirous of selling shares for the purpose of financing development work and that if average values are such as would indicate a big commercial proposition, then the quicker such a fact is advertised the sooner would the requisite finances be made available.

Clifton-Porcupine.

According to reports from the North the Clifton-Porcupine, owners of the Preston claim which adjoins the Dome Mines, is making good headway and meeting with excellent results.

In the early days of the camp a considerable quantity of commercial ore was produced from the property but financial backing appeared to be more or less limited and finally resulted in curtailment of work. The Clifton-Porcupine Company is understood to be well financed and is prepared to develop the property along important lines.

Leroy Lake Syndicate—Gowganda.

Surface work is well under way on the former Gowganda property of the Leroy Lake Syndicate, now under the control of eastern interests, with whom are associated Messrs. L. C. Campbell, and W. Fairburn, leaseholders of the Foster mine at Cobalt.

James Robertson, a former M.P. in the Province of New Brunswick, is understood to also be interested in the financing of the operation, having paid a visit to the property this week.

Dickson Creek—British Capital Available.

Arrangements are being made to resume underground operations at the Dickson Creek Mine, situated on the shore of Lake Temiskaming about half way between Haileybury and New Liskard. It is understood the head office in England has been permitted to release the finances required to operate the property along more or less extensive lines. During the course of the war, particularly in the closing stages, the British authorities took steps to discourage the sending of capital out of the country, with the result that mining properties in this country financed by British money were obliged to curtail operations. The release of finances for the Dickson Creek would appear to indicate that the restrictions have either been modified or relaxed.

Silver at Sixteen to One?

The utmost optimism prevails among the silver producers on the strength of the belief that a genuine movement is on foot in the United States to organize a league for the purpose of regulating the price of silver, and with a view to perhaps holding quotations at around $1.29 an ounce. The high grade deposits of silver in Cobalt make possible the realization of large profits at the present price of silver, and the manipulation of its market value to an equivalent of sixteen ounces of silver to one of gold will swell to a very considerable extent the margin of net profit. Whether or not this proposed league will actually come into being and prove as effective as calculated remains to be seen. Very recently it was intimated that an important announcement might be forthcoming early in July.

Personals—Northern Ontario.

David Fasken, president of the Nipissing Mine Company, has returned to Toronto after having paid a visit to the mine.

Mr. Haines, president of the Penn-Canadian mine is a business visitor in Cobalt this week.

Morgan R. Cartwright, manager of the Adanac mine is in Buffalo, attending the funeral of his father who died in that city this week.

BRITISH COLUMBIA.

THE NEED FOR A NATIONAL RESEARCH INSTITUTE.

Mr. Nichol Thompson, Chairman of the Mining Bureau of Vancouver, in supporting a resolution of the Board of Trade of Hamilton, Ontario, favoring the formation of a National Research Institute for Canada made some interesting references to the possibilities of the complete utilisation of the constituents of coal. Mr. Thompson's remarks were as follows:

I may say that I am heartily in accord with the spirit of the resolution; the enormous debt which we have incurred through the unfortunate war in which our Canadian boys have played such a conspicuous part, can only be redeemed by everyone in the first place practising the greatest thrift and conservation possible, for we have, as the letter states, in the past been one of the most wasteful of nations, and in the second place, there should be greater development of our natural industrial resources, and in order to secure this development and be able to meet other nations on anything like an equal footing, it will be absolutely necessary for us to devise ways and means through the work of men specially qualified to do research work in all the branches of industrial, commercial, agricultural and above all, human resources.

Canada, in establishing a National Research Institute, is only following the example set by other nations, who have taken to heart the lessons taught by the results of the late war. Great Britain, France, the United States and even Japan have set aside large appropriations of money for the promotion of chemical and scientific research.

Speaking on science and industry, Dr. Arthur Shuster, lecturing at the Regent Street Polytechnic in London a short time ago on pure science in relation to national life, said that the duty to work, the right to live, and the leisure to think were the three prime necessities of our existence. The prosecution of pure science was the search of knowledge for its own sake and the greater the industrial need, the greater must be the need for scientific research, for science was the organizer of common-sense. We look to science for a new outlook, which would have a primary influence on national life through its effect on the human mind.

Speaking at the annual meeting of the Silk Association of Great Britain and Ireland, at the Cannon Street Hotel a short time ago, Sir Henry Birchenough said that as a member of one of the committees created to deal with the trade problems of the war, he had been more than ever impressed with the necessity of better organization of the trade interests of the nation. Individual enterprise had its advantages no doubt in the past, but it had become too much of a fetish among us and when the rest of the nations were utilizing cartels and combines and othre organized efforts to regulate and advance the interests of their industries, it was time that we readjusted our methods to meet the changed situation, and instead of trusting to the old system of individual competition, we should co-ordinate individual effort by combination and organization.

The question of tariffs and government assistance were not new but they had ceased to be academic and were now issues of practical urgency.

Nothing had done more to bring this fact home to us than the discovery, which appeared to have amazed both the Government and the commercial community, that certain key industries, which many of our trades depended upon were practically in the control of the enemy.

Two lessons we had learned from the war. The first was that we must make ourselves absolutely independent of all foreign sources of supply of things upon which our national security depended, and the second was that we must be equally independent of the foreigner for the supply of things upon which the security of our industries depended.

At a dinner given to Premier Wm. Hughes of Australia in London, presided over by the Marquis of Londonderry, the object of which was to enable the Prime Minister of Australia to meet representatives of capital and labor in England, Mr. Hughes

said there had been general assent to the necessity for organization, but much confusion in the minds of many persons here and elsewhere as to what precisely is meant by "Organization." "The organization of which I speak," said Mr. Hughes, "is not a formula, nor a doctrine, nor an electioneering cry, but just the adoption of plain business-like methods to the circumstances of Britain, the Empire, and of every industry in it. It is national in scope, non-party in aspect, is not for the benefit of one class, but for all classes, for labor, for capital, for the nation, for the Empire. It is not a weapon from the armory of the faddist, to be used for tilting against windmills, but a flexible, convenient and effective instrument by which the welfare of the nation and that of every individual in it can be materially improved. What it does propose, is to utilize and develop the resources of the Empire, ensuring an adequate supply of raw materials for our industries, and to equip those industries, with the most up-to-date methods, so that regular and profitable employment for all available capital and labor will be assured, and wealth production per unit of labor and capital so greatly increased that we shall be able at once to carry the huge burdens imposed by this war, find employment for all our people, at good wages and decent conditions of labor, and enable Britain and the Empire to hold their own on their merits in the home and foreign market."

These are the sentiments of some of the foremost men of the Empire, and are germane to the subject of the Resolution which the Hamilton Board of Trade wishes this Board to support.

If time would permit I could give you many instances of prodigal waste in connection with many of our industries, but take one of our principal natural resources, that of caol. We import millions of gallons of crude oil every year at the expense of our coal industry, whereas if we were to adopt proper scientific methods, we could not only supply to a very great extent our own oil requirements, but also a valuable fertilizer, which we also import, and in addition would provide a smokeless fuel at a cost much below the present price of coal. Perhaps it is not generally known that our coals contain approximately 40 gallons of oil to the ton. They are higher in nitrogen than any other coal I know of and consequently high in the product of sulphate ammonia, one of the principal fertilizers.

Speaking of the shortage of petrol during the war, Mr. F. D. Marshall, president of the Institute of Gas Engineers, London, gave a concrete instance of the average results of two extreme types of coal which had been subjected to low temperature carbonization on a commercial scale. One, a poor coal classed as colliery refuse, worth about fifty cents per ton, the second a high grade Scotch canel coal rich in oils worth five dollars per ton.

Based on carbonizing these coals at the rate of only 200 tons per day or 72,000 tons per year, they obtained on the average of the two, the following products:

	Gallons.
Motor spirit (petrol)	260,000
Light oils	588,000
Middle oils	1,126,000
	Tons.
Bitumen	8,000
Sulphate ammonia	526

and in addition to this 44,000 tons of smokeless fuel or coke, practically gratis, as the yield of spirit oils and ammonia pays for the cost of the raw coal plus the cost of carbonizing, etc. The value of the spirits, oils and sulphate alone at the prevailing prices would be over £40,000 or approximately $200,000, but besides this the coke, if further gasified, will yield in addition to the quantity of 526 tons obtained by the preliminary carbonization of the coal, a further quantity 1,047 tons of sulphate of ammonia, making a total yield from the original coal of 1,573 tons of sulphate, and on this second process each ton of coke will yield on the average 121,000 feet of power gas, and every 70 cubic feet of this gas when consumed in a good gas engine, will develop what is termed one brake horse-power, so that from 44,000 tons of coke, which we obtain gratis, we get 75,000,000 brake horse-power on the aggregate for one year, which would equal approximately 7,000 brake horse-power per day free of cost. So you see if we were to deal with our coal rationally we could take from it the valuable volatile matter it contains in the form of spirits, oils and tar acids, and turn the resultant pure carbon or coke into power, which is the only sane way of dealing with this national standard asset, instead of allowing it to escape in huge volumes of black smoke poisoning the atmosphere, destroying vegetation and seriously affecting the health of the people.

The same is practically true of our smelters. We import sulphur from Japan for the manufacture of sulphuric acid for our powder works and also for use in our pulp mills, and thousands of tons of sulphur is belched into the atmosphere every year from our own copper smelters. Sulphur is the base of approximately all the alkalies such as washing soda bleaching powder, etc., which we ought not only to make for our own requirements, but have an ample surplus for export to the Orient, a market supplied from Europe and the United States.

These are some of the evils which this National Research Institute will assist to remedy and I hope this Board will strongly support its establishment by the Government of Canada .

INDUSTRIAL RE-TRAINING IN ONTARIO.

"Pensions are all very well but they will never stop the brooding and the bitterness of those who gave up their best energy forever, in the prime of their youth —you can't cure that with money; occupation and sense of usefulness will alone do it. To assure everyone of the chance of that, is the very least we can do for the men who have done so much for us."

John Galsworthy.

The fulfilling of this duty in Ontario is in the hands of the Department of Soldiers' Civil Re-Establishment through the Vocational Branch.

The work of this Branch begins in the Hospitals where the patients in the earlier stages of convalescence, are taught basket-weaving, wood carving, etc., and in the more advanced stages, in the Curative Workshops where carpentry, shoe-repairing and fifteen or more other subjects are taught. In addition to providing mental occupation these classes also tend to direct the man's mind towards earning his own living, when he is discharged from the hospital.

The Bedside and Ward Occupation are taught by Ward Aides trained for the Dominion by the University of Toronto in conjunction with the Branch and number over 250 to date.

On discharge from Hospital or Discharge Depot, if the Vocational Officer in the Hospital or Depot thinks

the man is eligible for retraining under Government Pay and Allowances, he is advised to report to the District Vocational Officer, Keen's Bldg., Toronto, or at any of the District Sub-Offices at Hamilton, Brantford, Kingston, Ottawa, Guelph St. Catharines or London, or at one of the Sub-Offices at Windsor or Stratford. Any disability incurred by service which renders it impossible for him to continue his pre-war occupation, constitutes eligibility for re-training.

At the above offices the man is interviewed by men who have been chosen on account of their understanding of human nature and of the soldier, and for their wide experience in business and industrial fields. From the Preliminary Interviewers, particulars as to the last Medical Board, the man's dependents, his education and industrial experience, are noted and placed with the fyle recording his progress in Vocational Classes in Hospital, etc.

He next appears before a board composed of two Vocational Officers and a Vocational Medical Adviser who endeavor to select a means of livelihood in which the applicant can compete with the normal worker.

In deciding a suitable course, the Board must give consideration to the following factors:—

What particular trend did the man's own wishes take in Hospital?

What is the best course considering the man's disability, prospects in suggested trade, and pre-war occupation?

What work can he be placed in and derive maximum value from his former civil experience?

Is there anything akin to his old job, when 100% efficiency can result from retraining?

Will it aggravate his disability?

For doubtful cases or those rejected by the Interviewers a hearing is given by the Advisory Board or Court of Appeal.

Courses of re-training have been arranged for in the University of Toronto, Vocational Classes and in Private Institutions, and the subjects to date total over 55.

In addition there are over 1,100 present being trained directly in Industries in Ontario. The "Industrial Survey" sub-branch locate firms willing to assist in the work, and after the man is placed, visit him weekly or oftener, making reports on the man's progress and conduct at work as well as on the opportunities offered by the Plants themselves. During this course of re-training on Government Pay and Allowances, the man is given any Medical treatment necessary, free of charge.

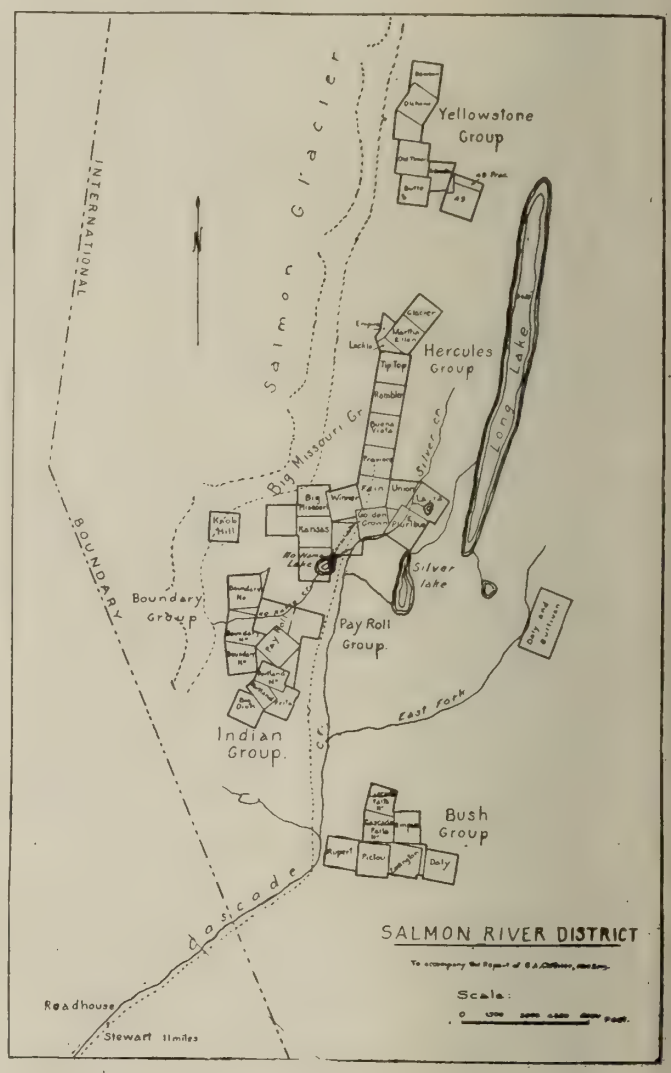
Three weeks before the completion of a course each man's case is referred to the "Information and Service" sub-branch of the Department for the purpose of finding him employment.

The "After-Care" sub-branch visits the home and occasionally the place of employment of the man after graduation from his course of re-training, and makes him feel he still has the Department's support and interest. When the graduate has four month's continuous employment it is deemed that he has "settled down" and visits cease, but not their interest and support, however.

In addition to the above sub-branches there are also the Administrative, Research, Medical, Reference and Literature, Supplies and Equipment, Records, Social Service, Adjustment and Claims, Accountants and Statistics.

SALMON RIVER, B.C.

We reproduce here a map of the Salmon River District, which will serve to illustrate that part of the Portland Canal Section, Northern British Columbia, which is at present attracting so much attention and where much development is expected this season. The sketch, which was prepared by George Clothier, Resident Mining Engineer, does not show several groups, notably that of the Bush Mines, Ltd. What was known as the Bush Property when Mr. Clothier examined the district is now the Premier Mine, shown on the map as the Bush Group. Another of the important properties not shown is the Mineral Hill Group which adjoins the Big Missouri Group on the east.



McKinley-Darragh.

Within the next few days the McKinley-Darragh will commence the exploration of the south-eastern part of its property, adjacent to the Nipissing. A cross-cut was driven into this section of the property some years ago, but the volume of work in other parts of the mine has required full attention in recent years, with the result that the proposed raising and exploration was not completed in the south-east corner.

A part of the area now about to be explored contains conglomerate formation and presents fair prospects of ore development.

The Oil Concession Correspondence

The Original Proposal.

July 30, 1917.

To Hon. W. J. Roche,
Minister of the Interior,

Territory Applied For.

Sir,—On behalf of "The 'Shell' Transport Company, Limited, of London, England, hereinafter referred to as "The Company," I beg to make application through Lieutenant-Colonel Adam T. Shillington, of Ottawa, for exclusive oil and natural gas rights for the period of the duration of the war and including five years after the declaration of Peace, over that part of the Province of Alberta lying north of the iffty-fifth degree of North latitude, and that part of the north-west territory of Canada bounded as follows:—On the south by the Northern boundary of the said Province of Alberta; on the East by a prolongation of the eastern boundary of said Province till it strikes the sixty-fifth degree of north laatitude; on the North along said sixty-fifth degree of latitude west to the Eastern boundary of the Province of British Columbia, thence South along said last mentioned Eastern boundary till it strikes a prolongation of the Northern boundary of the Province of Alberta and thence Eastwardly to the point of beginning, subject to the following conditions to be observed by the petitioner company and by the Government of Canada.

Concessions Already Granted.

1.—The exclusive rights so mentioned shall not in any way interfere with any rights already granted to any persons, firms or corporations within the boundaries above set out, but shall only apply to territory not yet conceded except in case of leases which may from time to time fall in or be cancelled.

Operation .

2.—The Company shall, if this concession is granted, begin and in a substantial way at the first open season after the date of such grant, and shall during the duration of the war, honestly and reasonably proceed with the exploration for oil and natural gas, and after the declaration of Peace the company shall measureably increase their efforts along these lines, and shall carry on the work in a measure proportionate to the magnitude of the territory comprised in the concession.

Rights of Way, Sites, Etc.

3.—The Company would require the free grant of rights of way over ungranted lands for all necessary pipe lines, telegraph and telephone lines, railways and highways and of land for the sites of reservoirs, storehouses and refineries or other factories to be established by them in connection with the exploitation of said oil fields, if any are found in said territory.

Customs Duties.

4.—The Company should be allowed to import, free of customs duties, any necessary machinery not manufactured in Canada, for the carrying on of the exploration and production of said oil and gas for the refinery of said oil.

Restrictions.

5.—The Provisions of the Government Regulations "for the disposal of petroleum and natural gas rights," so far as they may reasonably apply to and not be inconsistent with, or repugnant to, the terms of spirit of the agreement to be founded on this application shall apply:—

6.—It is a prime condition that for the duration of this agrement, after the proclamation of Peace, the this agreement, after the proclamation of Peace, the territory for oil and gas shall bear reasonable proportion to the scope of country assigned, or conceded, though for the previous period these efforts cannot be so large owing to the fact that many exports are not now available on account of the war.

Bonus.

7.—It is desirable that the present bonus on production of crude oil be continued to the Company so long as Canada imports more oil than it exports, and that the Royalty foreshadowed to be imposed after January 1st, 1930, shall not exceed, so far at least as the Company is concerned three (3) cents per barrel.

Tax Exemption.

8.—That during the time the Company's operations shall be within unorganized territory and for a period of fifteen years after such territory shall have been organized there shall be upon the company's property, or works, within said territory, no assessment levied by way of tax or impost.

Rents and Charges.

9.—No rental charges shall be made against the company for any land used by the Company for the purposes herein set out until the same shall be conveyed to the Company by lease nor shall they be chargeable for the wood or water used by them for the said purpose of exploration and production which may be taken from lands now in possession of the Government.

Hudson Bay Land Grants.

10.—Full regard should be paid to the Company's interests in the selection of such lands as the Government may be under obligation to withhold from the lease for the purposes of their agreements with the Hudson Bay Company.

Your Petitioner would set forth the following as some of the reasons why so large a concession in point of territory should be asked for by the Company.

Transport Facilities.

1.—The absolute absence of transport facilities in the territory covered and for hundreds of miles outside the territory necessitating the expenditure of an enormous amount of money in providing said transport facilities.

2.—Petroleum being a liquid and transport facilities when established being almost exclusively for carrying solids all the necessary equipment, even outside the territory has to be especially created, and owing to peculiar construction can only be used for carrying oil and are not of service for other products,

so that a large supply of oil must be produced in order to keep said special transport facilities profitably employed.

Difficulties of Operation.

3.—Owing to the severity of the winter season in Northern Alberta, and the adjacent territory it is practically impossible to carry on operations particularly as the transport in pipe lines, except at an initial expense which would be prohibitory, which necessitates immediate outlay for reservoirs and storage places for the product during that portion of the year when it is impossible owing to climatic conditions to transport the oil.

4.—These reasons which apply only to the territory covered by this application and not to Southern Alberta, where both transport facilities and climatic conditions are favorable to exploration and production by people of small means form insurmountable objections to the attempt to prospect and exploit on the part of anyone except a corporation of unusual financial strength or the Government itself.

Financial Strength of Applicants.

The market value of the stock of "The Shell Transport Company, Ltd.," exceeds one hundred and twenty million dollars, while the various capital stocks of its many subsidiary companies will in the aggregate amount to at least an equal amount, amply proving that the applicant company is financially quite equal to the burden. The business of the company, and its allied companies, is the production of oil, a business which they carry on in every known oil producing region in the whole world, and their experience in Russia, Dutch East Indies, Borneo, Mexico, California and Roumania, amply justifies the statement that no other British oil producing company has either equal wealth or experience in technical knowledge for the task.

The tremendous importance of oil as a fuel and as a power producer cannot be exaggerated, and when a company of known ability and standing is willing to risk its own money in such large measure in a country so difficult of access, even for exploration purposes, and so much more difficult for purposes of production, I would respectfully suggest that no possible criticism would come from any person on account of granting oil and gas rights over a territory that cannot possibly be even examined for a sufficient supply of oil except at so great an initial outlay as to prevent anyone except a Government or a great corporation from undertaking the task. The opening up of the country as proposed, if oil is found in paying quantities, provides that the present concessionaires will have without expenditure on their part transport facilities to enable them to market a product which, but for such facilities would be of no more use to them than so much water. The present scarcity of fuel oil and the many useful bye-products of oil teach us the importance of the possession of oil within the Imperial boundaries, and your petitioner humbly requests that the prayer of this application may be granted and agreements and undertakings based upon the same may be entered into between the Honourable, the Minister of the Interior, representing the Government of Canada, on the one part, and your petitioner, representing "The Shell Transport Company, Ltd.," on the other part, for the carrying out of the purposes set out in said application.

Your petitioner further ventures to point out that the large sums to be spent by this company by exploration, and the much larger sums to be spent in production of oil, if paying quantities shall be found as a result of such exploration, will be of inestimable value to Canada in opening up a vast region which is now an uncultivated waste.

Dated at Ottawa, July 31st, 1917.

(Sgd.) R. N. BENJAMIN,
(Sgd.) pp. ADAM T. SHILLINGTON,
his Attorney.

Mr. Meighen's Acknowledgment.

12th November, 1917.

Dear Colonel Shillington,—

Since taking over the Department of the Interior I have had brought to my attention the application you presented to my predecessor, the Hon. Dr. Roche, on behalf of The Shell Transport Company, Limited, of London, England, for certain rights and concessions in connection with petroleum in the Northern part of the Province of Alberta. I have carefully perused the application and am impressed with the importance of the scheme outlined therein. The matter will, however, have to stand in abeyance until after the General Elections, when I hope to give the application my most careful consideration, and as soon as a decision is arrived at I will communicate with you further.

Yours very truly,
A. MEIGHEN.

The Controller's Letter.

Department of the Interior,
Ottawa, 25th January, 1918.

Sir,—I beg to refer you to your letter dated the 30th of July last, addressed to the Minister, applying as attorney for R. N. Benjamin, on behalf of The Shell Transport Company, Limited, of London, England, for a reservation of the exclusive right to the petroleum and natural gas, the property of the Crown, in that portion of the Province of Alberta lying north of the 55th° of north latitude, and that part of the North-West Territories lying south of the 65th° of north latitude and west of the projection of the eastern boundary of the Province of Alberta. The application also included free rights of way and sites for reservoirs, refineries, etc.; freedom from custom duties; the present bonus on the production of crude oil; absence of impost tax for fifteen years after the organization of the territory; and free timber and water required in connection with operations.

In reply I beg to inform you that the application made by you, as attorney for Mr. Benjamin, has been under careful consideration, and it has been decided that the Department is not in a position to consider the reservation of the rights described in the application above referred to.

H. H. ROWATT,
Controller.

Lt.-Col. A. T. Shillington, M.D.,
281 Gilmour Street,

The Second Proposal.

122 Wellington Street,
Honourable Arthur Meighen,
Ottawa, May 3rd, 1918.

Dear Sir,—

On behalf of the Shell Transportation & Trading Co., Ltd., of London, England, I am enclosing you an application for prospecting rights over certain portions of Alberta and the N. W. T.

I do not know that it is necessary for me to say

anything in regard to the Shell Transportation & Trading Co., Ltd., as the Company is so well known in Great Britain. The activities of the Shell Co. extend to Russia, Roumania, Egypt, Borneo, Sarawak, Mexico, the United States, South America and elsewhere.

The Company was formed in 1897, being an amalgamation of tank, steamer and oil interests. I would be very pleased indeed to give you the fullest possible information in regard to the Company.

The following particulars will give you an idea of the volume of the Company's business. Dutch East Indies production during 1916, over 11,000 bbls.; Russia production during 1916, 10,000 bbls.; Roumania production 1916, eleven months, 2,500,000 bbls.; United States, exclusive of the State of California, production 1916, 4,684,000 bbls.; California production 1916, 4,809,403 bbls. Production in Mexico during 1916 was very large, but was intentionally curtailed by reason of export difficulties.

I would respectfully call your attention to the following reasons in favor of granting the Company the right to prospect over the area described in their application:—

1.—The absolute absence of transport facilities in the territory covered and for hundreds of miles outside the territory, necessitating the expenditure of an enormous amount of money in producing transport facilities.

2.—Petroleum being a liquid, and transport facilities when established being almost exclusively for carrying solids, all the necessary equipment even outside the territory has to be especially created, and owing to the peculiar construction can only be used for carrying oil, and are not of service for other products, so that a large supply of oil must be produced in order to keep special transport facilities profitably employed.

3.—Owing to the severity of the winter season in Northern Alberta and the adjacent territory, it is practically impossible to carry on operations, particularly transport in pipe lines, except at an initial expense which would be prohibitory, and necessitates immediate outlay for reservoirs and storage places for the product during that portion of the year when it is impossible owing to climatic conditions to transport the oil.

4.—These reasons, which apply only to the territory covered by this application, and not to Southern Alberta, where both transport facilities and climatic conditions are favorable to exploration and production by people of small means, form insurmountable objections to attempts to prospect and exploit on the part of anyone except a corporation of unusual financial strength or the Government itself.

5.—It is unnecessary for me to point out that the large sums to be spent by the Shell Company in explorations and the much larger sums to be spent in production of oil if paying quantities are found as result of such explorations, will be of inestimable value to Canada in opening up the vast regions which are now an uncultivated waste.

Kindly give this application your early consideration and oblige,

Yours very truly,
R. A. PRINGLE.

The Reply.

May 9th, 1918.

R. A. Pringle, Esq.,
Dear Mr. Pringle,—

I have your letter of May 3rd, enclosing applications for prospecting rights on behalf of the Shell Transportation and Trading Co., Ltd.

The concessions asked for in this application are such that the same could not be considered.

(Sgd.) ARTHUR MEIGHEN.

Request for Withdrawal of Second Proposal.

May 21, 1918.

Hon. Arthur Meighen,
Dear Mr. Meighen,—

Yours of the 9th instant in regard to application made on behalf of the Shell Transportation and Trading Co., Ltd., duly received.

In view of your decision that the concessions asked for are such that they could not be considered, acting under instructions from my client, I would ask to have the application withdrawn.

(Sgd.) R. A. PRINGLE.

The Application Returned.

22nd May, 1918.

Dear Mr. Pringle,—

I have to acknowledge the receipt of yours of the 21st, and not that you desire to withdraw the application made on behalf of the Shell Transportation and Trading Co., Ltd. I am returning the application herewith.

(Encl.)

ARTHUR MEIGHEN.

Sir Reginald MacLeod Asks for Interview With Sir Robert Borden.

8th July, 1918.

The Hon. Arthur Meighen, M.P.
Dear Sir,—

I have the honour to enclose copy of a letter I am forwarding to the Rt. Hon. Sir Robert Borden, and I shall be gratified if I may be favoured with an interview at an early date.

(Sgd.) REGINALD MacLEOD.

8th July, 1918.

The Rt. Hon. Sir Robert Borden, K.C.M.G.
London, W.C.
Dear Sir Robert Borden,—

You were good enough in April and May of last year to receive and consider certain communications from me on behalf of the "Shell" interests regarding exploration of territories in Western Canada.

You authorized the Hon. Robert Rogers, then in England, to discuss the matter with me, and as a result of several interviews with him and in compliance with his suggestion I forwarded on the 4th May, 1917, a general statement indicating the lines on which the "Shell" Group would be prepared to undertake the work of exploration and development, together with some reference to the position and experience of the Company.

It was then felt that negotiations could hardly proceed further in this country as Mr. Rogers could not conveniently enter into detail regarding a subject of such importance which lay under the control of another department of State. Moreover, his return to Canada rendered it necessary for further discussions to take place at Ottawa.

The Company then authorized Colonel A. T. Shillington to carry on these negotiations in Canada, and they learn from him that he has been in frequent communication wtih the Ministry of the Interior.

No decision has, however, been reached nor, it appears, can be reached until it has been decided as a matter of State policy whether the Government is desirous of entering into an agreement with the "Shell" Group, which would secure:

(1) for the Government skilled examination of territory, and skilled extraction of oil should such be discovered, all risks and charges being defrayed by the Company, and

(2) for the Company exclusive rights to selected portions of a sufficiently large area for a sufficient time to render their work effective and —if oil be found—successful.

The "Shell" Group in a point of resources, experience, and attained success over the world stands pre-eminent.

As a matter of special interest I would beg to point out that since my last communication the operations of the Company in Egypt have been greatly extended, and the Anglo-Egyptian Oil Company has now attained an assured position as owning one of the most important oil fields in the Empire.

Appended hereto are extracts from the Report of the Financial Adviser to the Government of Egypt, and there is also enclosed a copy of the Company's report just issued.

Sir Marcus Samuel, Chairman of the "Shell" Co., and his colleagues, would be gratified if the responsibility of seeking for, and, if found, of testing on a large scale, and in a scientific and comprehensive way the oil capacities of the area suggested in Western Canada were entrusted to them, and they would approach the problem with the firm intention of making research thorough and success—if success there be—large and enduring.

They feel, however, that the negotiations cannot be indefinitely prolonged.

The presence in this country of yourself, together with the Minister of the Interior, and the Prime Minister of the Province of Alberta—within the boundaries of which this territory mainly lies, and which is pre-eminently cnocerned in the success of the project under review—appears to offer a favourable opportunity of arriving at a decision on the main point —whether the Dominion and Provincial Governments view with favour the general proposition that a large area should be examined on scientific lines under the responsible management of the "Shell" group.

If this proposition be viewed with favour, perhaps Mr. Meighen would honour me and one of my colleagues on this Board with an interview leaving the arrangement of details for adjustment either here or in Canada.

I am taking the liberty of forwarding a copy of this letter to the Hon. Arthur Meighen and to the Hon. Charles Stewart.

(Sgd.) REGINALD MacLEOD.

Hon. Mr. Meighen's Reply.

9th July, 1919.

Dear Sir,—

I have your letter of the 8th instant, enclosing copy of communication of the same date addressed to our Prime Minister; also extracts from Note by the Acting Financial Adviser on the Budget of 1918. All of these I have read with care.

Several months ago a proposal was made on behalf of what is known as the "Shell" Group by Doctor Shillington, of Ottawa, Canada, to the Department of the Interior, over which I preside, looking to the securing of certain concessions for the purpose of oil exploitation in the Province of Alberta and the North. These proposals were of such a character that they could not for a moment be entertained. Later on, and shortly before I left Canada, the proposals were put in somewhat different form, but were still impossible of consideration. The Mines Branch of the Interior Department has regulations framed under the authority of Statute under which all operations in lands owned by the Dominion must be carried on. There are many companies operating under these regulations.

The Department would not be disposed to make special concessions in favour of any special concern or group, and could only consider any proposal along that line under the most special circumstances, and embodying the most adequate guarantees and return.

Unless the "Shell" people have definite proposals to make of a character very substantially different from those already presented, I do not think there would be any advantage in a discussion of the subject. If they have such proposals I would be glad to discuss the matter with you, and would suggest Saturday next, at 12 noon, at my rooms at the Savoy.

A. MEIGHEN.

London, W.C., July 10th, 1918.

My dear Meighen,—

Sir Reginald MacLeod suggests in his letter to me of the 8th instant (copy of which has been forwarded to you) that an interview between you and the Premier of Alberta will be desirable from his standpoint. Will you be good enough to give his request your best consideration.

Yours faithfully,
(Sgd.) R. L. BORDEN.

Hon. Arthur Meighen,
Savoy Hotel.

Memorandum Supplementing Interview.

London.
24th July, 1918.

The Hon. Arthur Meighen, M.P.,
Minister of the Interior of Canada,
Ottawa.

Dear Mr. Meighen,—

I trust by the time this letter reaches Ottawa you will have arrived safe at home.

I had hoped to have been in a position to send you the memorandum which you suggested as desirable to set forth at fuller length the observations by Mr. Benjamin on the occasion of our recent interview.

It has been impossible to complete this memorandum in view of the great stress of other business, and I write these few lines to tell you that the matter is being carefully dealt with with all reasonable speed and that we greatly hope to be able to forward it to you in the course of next week.

Yours very truly,
(Sgd.) REGINALD MacLEOD.

8th August, 1918.

The Hon. Arthur Meighen, M.P.
My dear Mr. Meighen,—

Mr. Benjamin and I have been seriously considering the kind suggestion you made at our recent interview that we should draw up a memorandum covering our recent conversation and the suggestions arising out of it for the entrustment to the "Shell" Group by the Dominion Government of the search for and, if found, the exploitation of oil in the Province of Alberta and neighbourhood.

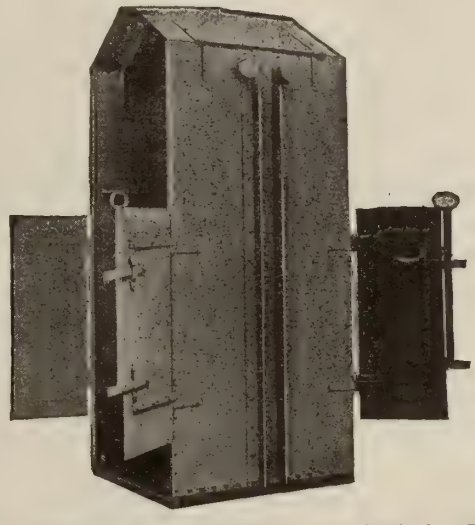
SAFETY MINE CAGES

MADE TO FIT YOUR SHAFT

We build these Cages to suit you and your workmen. They are Safe, Strong, and Reliable.

¶ The top doors permit the carrying of long timbers, or the escape of the men in case of accident.

¶ The hand rails are properly placed to safeguard the passengers in the quick ascent or descent.



¶ We supply these cages with either one or two sets of doors for inlet or exit, to suit your shaft.

¶ Rails are also laid in the floor, if required, for convenience in handling the cars.

MARSH ENGINEERING WORKS, LIMITED, Established 1846 **BELLEVILLE, ONTARIO, Canada**

Sales Agents: MUSSENS, LIMITED, Montreal, Toronto, Winnipeg and Vancouver

BRITISH COLUMBIA

The Mineral Province of Western Canada

Has produced Minerals valued as follows: Placer Gold, $75,116,103; Lode Gold, $93,717,974; Silver, $43,623,761; Lead, $39,366,144; Copper, $130,597,620; Other Metals (Zinc, Iron, etc.), $10,933,466; Coal and Coke, $174,313,658; Building Stone, Brick, Cement, etc., $27,902,381; making its Mineral Production to the end of 1917 show an

Aggregate Value of $595,571,107

The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1895, inclusive. $94,547,241; for five years, 1896-1900, $57,605,967; for five years, 1901-1905, $96,509,968; for five years, 1906-1910, $125,534,474; for five years, 1911-1915, $142,072,603; for the year 1916, $42,290,462; for the year 1917, $37,010,392.

Production During last ten years, $296,044,925

Lode-mining has only been in progress for about twenty years, and not 20 per cent. of the Province has been even prospected; 300,000 square miles of unexplored mineral bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than those of any other Province in the Dominion, or any Colony in the British Empire.

Mineral locations are granted to discoverers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full information, together with Mining Reports and Maps, may be obtained gratis by addressing

THE HON. THE MINISTER OF MINES
VICTORIA, British Columbia

The suggestions are made in memorandum form, and are, of course, not intended for competition, but will obviously be available for such use as you may deem necessary in reference to your colleagues.

We are willing to fix, say, 5 years after the war, as the period within which 90 per cent of the territory shall be given back.

I shall be glad to hear that this outline meets with approval, and to have your suggestions for bringing the matter towards completion.

(Sgd.) REGINALD MacLEOD.

Memorandum with Regard to an Interview at the Savoy Hotel Granted by the Hon. Arthur Meighen To Sir Reginald MacLeod, and Mr. H. N. Benjamin, on the 13th July, 1918.

Sir Reginald MacLeod briefly opened the discussion referring to the letter he had received from the Hon. Arthur Meighen in which the latter had stated that the proposals put forward by Col. A. T. Shillington were unacceptable to the Ministry of the Interior in Canada, by reason of:

(a) the insufficient return and guarantee to the Dominion Government, and

(b) the large area asked for, while Mr. Meighen further stated that certain companies are working at considerable outlay under the existing mining laws without having obtained special conditions.

In the discussion that ensued Mr. Benjamin explained in general terms the reasons why geological exploration in an unproved country must take place over an extended area if a serious and economical exploitation is eventually to result.

Starting from the assumption that a serious deposit may probably be found in the Province of Alberta or in its neighbourhood, Mr. Benjamin proceeded to show how it was in the interest of the Dominion Government, on behalf of Canada and the Empire, that such deposit should be worked in a sound and economical manner and so as to obtain the best ultimate results in volume of production together with a duereturn to the Dominion Government and people.

Mr. Benjamin suggested a rough outline of a scheme by which the Dominion Government should entrust the search for a deposit and, if found, its eventual exploitation to the "Shell" Group on the basis that they should find the whole of the necessary funds by issue of preferred stock at a moderate rate of interest, the net profits of the venture being divided between the Dominion Government and the Group.

Mr. Meighen asked that the arguments on which the desire for an extended area were based and the proposal for association of partnership between the Government and the Group should be repeated in a communication addressed to him at Ottawa in such extended form as to give a comprehensive idea of the scheme.

(Continued in Next Issue.)

Storage Battery Locomotive.

(Continued from Page 448.)

promptly directed to this source of energy utilized through the medium of the highly perfected, nondestructible Edison Storage Battery, since with batteries of this type as the source of energy, small, compact and efficient locomotives are now being used to solve haulage problems. The locomotives equipped with Edison storage batteries undoubtedly present the most practical and cheapest medium of haulage for the majority of cases, since they may be readily utilized under any existing mine conditions. The following information is supplied by Powley & Townsley, factory representatives.

The Crown Reserve Mining Company, Limited, Cobalt, are the first company in Ontario's silver district to install a small storage battery type of locomotive, and this year put into service a one and a half ton Automatic Transportation Company locomotive. This type of locomotive presents many unique features on account of its wide application where trolley types have heretofore been impractical. This small locomotive, operating on 18 in. gauge 12 lb. rails, and having a haulage capacity of 12 to 15 tons on the level, at a speed of five miles per hour, has proved to be one of the most profitable investments in this company's service and the work accomplished by this small locomotive is nothing short of marvellous. It is designed for direct spur gear drive on all four wheels, from a 48 volt motor, taking its current from a 40 cell type A-6 Edison Battery, having a 10.8 KWH capacity, which is sufficient to operate the locomotive continuously for a ten-hour shift. The locomotive is provided with detachable battery boxes and when mines operate two or three shifts per day, an extra set of batteries is provided, and at the end of the shift the discharged battery is removed as a unit and the re-charged one substituted, thus providing continuous operation.

The wheel base of this locomotive is 28 in. It readily negotiates curves of 7 ft. radius. Its overall length can be restricted to a minimum of 7 ft. with a width of 28in., thereby being especially adapted for use in drifts, and new developments, where narrow passages are encountered. The economy of this small locomotive can be reckoned, since the current consumed for battery charge is but 15 KWH, and in the majority of cases current does not exceed 2c per KWH, representing 30c per day for current.

One small unit of this type replaces on an average of six men, lessening congestion, since it travels at a much higher speed and reduces the number of ore cars required owing to the rapid transportation provided.

The batteries are automatically charged at idle periods. When in continuous service an extra battery is employed. This is all done automatically, current being supplied from a small Hertner constant current motor generator set. When direct current is available, batteries are likewise automatically charged through a special type of automatic rheostat and are disconnected from the line when fully charged, through the medium of a chargometer, which is mounted on locomotive.

The installation was made by Powley & Townsley. Excelsior Life Building, Toronto.

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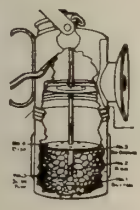

When the valve is opened the water starts to flow at No. 1, the carbide starts to expand, raising No. 4; this carries with it No. 3. The result is the same as when other lamps are raked by hand, with this advantage, the raking is taken care of automatically at just the right moment, the carbide is never vigorously agitated: there is no excess generation and no gas is wasted.

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Information on this subject can be obtained by writing:—

The Industrial and Resources Department Canadian National Railways
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COMPRESSED AIR COAL-CUTTERS IN CANADIAN MINES.

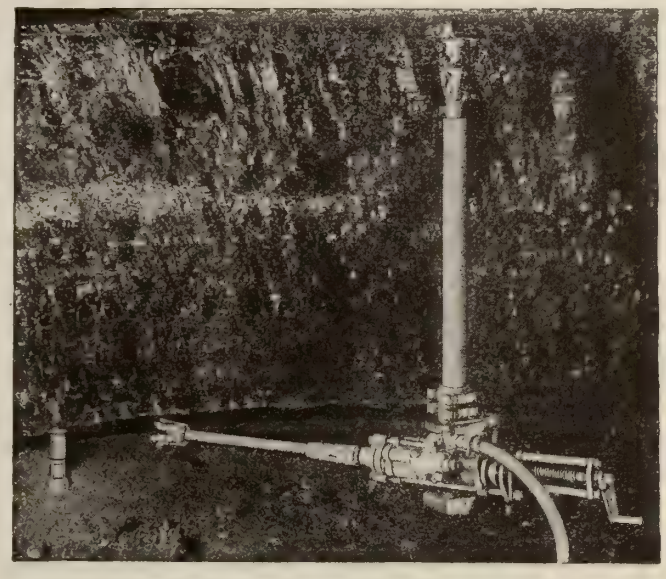
"Coal-cutters of the radial post type are coming into general use. These machines consist essentially of a percussive cutter of rock-drill type mounted on a column, fitted with a worm-gearing which enables the machines to cut either vertically or horizontally as desired. The radial machines do not impose so great a strain on the men operating them as do the "puncher" machines, moreover, they can be worked by comparatively unskilled men, whereas the successful operation of a puncher machine is a very specialized class of work."

This quotation from Bulletin No. 14 of the Mines Branch, Ottawa, written by the associate editor of "Canadian Mining Journal," Mr. F. W. Gray, gives a brief idea of the radial coal-cutter as used in Canadian coal fields. The radial coal-cutter, of which the "47," manufactured by the Canadian Ingersoll-Rand Company is an example, is practically a "piston-drill" on a special class of work, and for this reason the design of the radial coal-cutter differs in several particulars from that of the ordinary piston rock-drill, chiefly in connection with the valve. The chief work of the "47" Coal-cutter is for making cuts across the face of seams either horizontally or vertically. Where the machine is used for undercutting the column mounting is set up centrally in the "room," with the screw end next to the roof about 3½ or 4 ft. from the coal face. This allows plenty of room to manipulate the screw and to work the machine as close as possible to the bottom of the seam. By the worm crank the machine is swung back and forth, cutting a groove 2 inches deep on each swing. At the extremities of the undercut the groove is worked back to be square. The illustration shows this process very plainly, the screw at the top is shown, also the worm gear for swinging the radial coal-cutter.

One of the chief difficulties in coal-cutting is the occurrence of impurities such as sulphur in the coal. The radial coal-cutter will remove sulphur balls; these sometimes occur in bands 8 to 10 inches thick; the machine undercuts the lower 5 or 6 inches of this, and the remainder falls of its own weight or is easily barred down. The coal-cutter can also be used as an ordinary rock-drill for trimming or "brushing" entry rock walls.

A short description of the design of the "47" Coal-cutter may be of interest. The two principal features desired in the valve design of a radial coal-cutter are: A cushioned blow should the pick miss the coal, and an effective variable stroke. To secure these features the "47" uses a special form of valve with main and auxiliary valves. The auxiliary valve reverses when the piston has completed half its stroke, the main valve does not reverse till later. The main valve will reverse whether the piston completes its stroke or not, thus providing the variable stroke feature desired. If the pick misses the coal in the open end of the working the main valve will reverse in time to give the necessary cushioning effect. Still another feature of this valve mechanism is that the shorter the stroke the harder is the blow; this is useful in beginning a cut where the stroke is naturally short. The rotation is of the "release" type; with this type of rotation the ratchet is retaind by compression, and if the steel sticks the ratchet slips instead of breaking.

One difference between the radial coal-cutter is in the design of the drill bit. Instead of having a solid bit forged at the end of the drill steel as in the rock drill, the radial coal-cutter uses a special bit, in which are either three or five chisels; and these chisels can be removed independently for sharpening. The width of the cut is about five inches.



"47" Rand Radial Coal-Cutter.

The radial coal-cutter shows well on flat seams, but is particularly adapted for seams of 15 to 50 degrees pitch. Owing to the extreme variations in mine conditions it is impossible to give figures that will apply to very many mines. In Eastern Canada a great deal of the work is done by contract; that is, the miner is paid by the ton and pays his own help; this makes it difficult to secure accurate data on working. In one mine in Eastern Canada one "47" Radial Coal-cutter cut 12 rooms 20 ft. wide with 6 ft. depth of undercut in an eight hour shift. This is exceptional, but 100 tons per eight hour shift in normal working conditions, and 60 tons with adverse conditions can be expected with confidence.

The radial coal-cutter has the particular advantage of being readily portable; it is also not very expensive in first cost, and the repair cost of 300 coal-cutters in one of the Nova Scotia coalfields—came to $1.34 per machine per month, the results being taken for one year.

Optimism in Regard to Gold Outputs.

Having survived the period of war depression when labor could not be secured at any price, and when the cost of material was exorbitant and the delivery of supplies very unsatisfactory, the gold mines of Northern Ontario are now showing evidence of strength far greater than expected. The labor unrest which resulted in a strike at Kirkland Lake has been met with the utmost calm, and this newest of the productive gold camps appears to be content to perhaps wait until Fall before launching out into its full stride. In the Porcupine camp the utmost quiet appears to prevail in labor circles and it is thought that better judgment will hold sway. The coming Fall bids fair to witness every operating gold mine in Northern Ontario producing gold at full blast and bringing prosperity alike to the country, to the mine workers and to the country as a whole.

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DEPARTMENT OF MINES

HON. MARTIN BURRELL, *Minister* R. G. McCONNELL, *Deputy Minister*

MINES BRANCH

Recent Publications

Iron Ore Occurrences in Canada, Vol. II. Compiled by E. Lindeman, M.E., and L. L. Bolton, M.A., B.Sc. Introductory by A. H. A. Robinson, B.A.Sc.

The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.

Building and Ornamental Stones of Canada (British Columbia). Vol. V., by W. A. Parks, Ph.D.

Peat, Lignite and Coal; their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.

Annual Mineral Production Reports, by J. McLeish, B.A.

The Coal-fields and Coal Industry of Eastern Canada, by F. W. Gray.

Occurrences and Testing of Foundry Moulding Sands. Bulletin No. 21, by L. H. Cole, B.Sc.

Analyses of Canadian Fuels. Parts I to V, by E. Stansfield, M.Sc., and J. H. H. Nicolls, M.Sc.

Clay Resources of Southern Saskatchewan, by N. B. Davis, M.A., B.Sc.

Summary Report of the Mines Branch, 1917.

The Mineral Springs of Canada. Part II., by R. T. Elworthy, B.Sc.

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—

Fuel Testing Laboratory.—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.

Ore-Dressing Laboratory.—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.

Chemical Laboratory.—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.

Ceramic Laboratory.—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.

Structural Materials Laboratory.—Experimental work on sands, cements and limes is also undertaken.

Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.

GEOLOGICAL SURVEY

Recent Publications

Summary Report. The annual Summary Report of the Geological Survey is now printed in parts. Applicants should therefore, state what particular geologist's report is required, or what subjects they are interested in.

Memoir 95. Onaping Map-Area, by W. H. Collins.

Memoir 98. Magnesite Deposits of Grenville District, Argenteuil County, Quebec, by M. E. Wilson.

Memoir. 101. Pleistocene and recent deposits in the vicinity of Ottawa, with a description of the soils, by W. A. Johnston.

Memoir 105. Amisk-Athapapuskow Lake district, by E. L. Bruce.

Memoir 106. Road materials in a portion of Vaudreuil county, Quebec, and along the St. Lawrence river from Quebec boundary to Cardinal, Ontario, by R. H. Picher.

Map 63A. Moncton Sheet, Westmoreland and Albert Counties, New Brunswick. Topography.

Map 132A. Southwestern portion of Rainy River district, Ontario. Soils.

Map 135A. Lower Churchill river, Manitoba. Geology.

Map 145A. Timiskaming county, Quebec. Geology.

Map 154A. Southwestern Yukon.

Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.

Map 165A. Windermere, Kooteney district, B.C. Topography.

Map 174A. Blairmore, Alberta. Topography.

Map 179A. Onaping; Sudbury and Timiskaming districts, Ont. Geology.

Map 183A. Harricanaw-Turgeon basin; Abitibi, Timiskaming and Pontiac, Que. Geology.

Maps 1697 and 1698. Explored routes in a belt traversed by the Canadian Northern Ontario railway.—in two sheets: Sheet 1 Gogama to Missonga, Sudbury district; Sheet 2 Oatland to Penhurst, Algoma district, Ontario.

Map 1690. Whiteburn Gold District, N.S. Geology.

Map 1702. Klotassin, Yukon Territory. Geology.

Map 1710. Bothwell-Thamesville oil region, Kent county, Ontario.

May 1712. Foothills of Southern Alberta, St. Mary river to Highwood river. Geology.

May 1714. The Niagara peninsula, Ontario. Geology.

May. 1715. The Ontario peninsula. Geology.

Applicants for publications not listed above should mention the precise area concerning which information is desired.

Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to The Director, Geological Survey, Ottawa.

EDITORIAL

NEW LABORATORIES OF THE UNITED STATES BUREAU OF MINES.

The announcement that the new laboratories, and testing station for mine explosives, mine gases and coal dust, of the United States Bureau of Mines is to be formally opened and dedicated in September is of general interest, and, as representative of the mining industry of Canada, the JOURNAL congratulates the sister industry in the United States on having such facilities for research in matters relating to the operation of mines. While magnificent equipment is at the disposal of many universities, both in America and in Europe, we do not remember to have heard of provision of such excellence and magnitude at the expense of any other government as is available at Pittsburgh. Quite properly complaint was made before the Sankey Coal Commission in England by Dr. John Haldane of the miserably inadequate attempts that have been made to investigate the properties of mine air, the incidence of mine explosions, and matters relating to the safety of coal mines, such as stone-dusting and the testing of safety lamps, so far as these have been undertaken at Government expenses in Britain. In that country, the investigation of such matters has been left largely to private enterprise, and it is a matter for justifiable pride therefore in British circles that the investigation of the explosive properties of coal dust, the relation between mine air and the physiology of breathing, and other important achievements, owed so much to private investigators like Sir W. E. Garforth and Dr. Haldane, and that so much should have been done in the erection of laboratories and testing stations by personal and corporate benevolence.

One achievement upon which the United States Bureau of Mines is to be congratulated is the evolution of a practical type of breathing apparatus. It has always been apparent to those who were interested in breathing apparatus that each advertised type had its own peculiar excellences and its own peculiar defects, and that if some government controlled authority could by a process of combination of good points and elimination of defects experiment in the devising of a composite apparatus, a new and practical type of apparatus would be the result.

The coal wealth of the United States exceeds that of any other civilized nation, and it is eminently proper and fitting that its research equipment should be on a scale commensurate therewith. As Canadians are not envious, but we are ambitious, and trust that as our coal industry expands our research equipment may also keep pace. So far it has not done so.

"DECENTRALIZATION" IN THE COAL MINING INDUSTRY.

From an article in "Coal Industry" of Pittsburgh by George H. Cushing, we extract some conclusions of this competent authority on the coal trade in the United States as to tendencies in the mining industry. Mr. Cushing says:

> "The purchasing power of the coal users is going to be concentrated into a few hands which, when not offset by an equally centralized selling power, has a tendency to beat down the price of coal.
>
> "The essential force in production, labor, is being concentrated into a few hands. The power to negotiate the wage of labor is opposed by no equally centralized organization among the producers. This tends to advance the cost of production.
>
> "Also we have a proposal on the part of the government to control coal in order, thereby, to control the business which grows out of coal.
>
> "Every way the industry turns it faces solid opposition expressed in unit form. **Within the ranks of the mining industry we have remaining the same old decentralization.** One operator is pitted against another operator even in one district.
>
> "With the industry divided and sub-diivded into warring factions, we stand at every point confronting consolidated opposition. This, if continued, must end in nothing but the embarrassment, if not the destruction, of the industry itself."

Every sentence of Mr. Cushing's conclusions is as applicable to conditions in Canada as it is to those in the United States, and particularly applicable to Nova Scotia and the Crow's Nest and Fernie districts.

The Canadian National Railway Board has shown some scepticism as to the great increases which have taken place in the cost of coal production in Nova Scotia, and is inclined to use its centralized purchasing power to beat down the price of coal supplied from the Maritime Provinces.

The entry of the United Mine Workers of the America into control of the Nova Scotian coalfields centralizes the power of wage negotiation in no uncertain manner, and on the side of the coal-owners there exists no corresponding centralization.

The coal production in the month of June in Nova Scotia was, we have good reason to believe, the smallest since 1901. This is a matter of the gravest importance. June, of all months, is the one in which

the collieries should be producing large outputs, and production lost in June cannot be regained during the whole summer. With the smallest coal output for nigh on twenty years, with American coal coming into Montreal free of any competition from Nova Scotian coal, with a number of coal mines closed down, and others threatened with stoppage of work and foreclosure of mortgage, the miners' leaders are urging discussion of a six-hour working-day and a five days week. "Decentralization" is a mild term to apply to the internal conditions of the coal industry in Nova Scotia, and if continued, it must there, as in the United States, lead to "the embarrassment, if not the destruction, of the industry itself."

THE REPORT OF THE FUEL CONTROLLER.

The Final Report of the Fuel Controller of Canada is an interesting and thought provoking document. Mr. Magrath observes in his preface that the Report is divided into two parts, the first dealing with the fuel situation in Canada during the War, the second attempting to forecast fuel conditions of the future. Mr. Magrath further remarks that the first part is "merely of historical interest" except in the lessons it may convey and the light it may throw upon the fuel problems of the future.

In the dog days the discomforts of the "heatless Mondays" and the anxieties of the unusually severe winter of 1917-1918 may seem merely of historical interest, but we have a good deal to thank Mr. Magrath for. The unassuming and matter-of-fact recital of the activities of his Department, if carefully perused, will reveal many instances of the capable manner in which the Fuel Controller carried out the difficult task which was set him, and stands to the credit of Mr. Magrath and those who were responsible for his selection.

We reproduce in this issue the Fuel Controller's summary of the results achieved during the war period, which are sufficiently remarkable and explicit.

The section of the Report dealing with the future of the fuel problem in Canada is in reality an exhaustive monograph, dealing more intelligently and exhaustively with the fuel question than any previous attempt we recollect having come across. The geographical position of Canadian fuel resources in relation to the large centres of population is one of the peculiar problems of the Dominion. Appended to the Report is a diagrammatic map of the United States and Canada showing graphically the coal resources of each State of the Union and each Province of Canada. In studying this map one is immediately struck by the equable and generous distribution of coal in the United States, and by the tremendous disproportion between the coal resources of the Province of Alberta and the remainder of Canada. This map is worth more than reams of written explanation, and we would suggest that it be produced on thick paper or board suitable for wall reference.

If there is to-day any conflict between the industrial East and the agricultural West, we believe that a study of this map and a realization of its implications will show that before many generations are gone, the West will outrank the East in all that coal production means and carries with it. The opening sentence in the Fuel Controller's Report is: "Modern civilization has, in a large measure, been built on a foundation of coal."

The Report is reinforced by two papers by experts in the economic utilization of fuels, one by Warren S. Blauvelt, of Detroit, and the other by F. E. Lucas of Sydney, comment on which we will reserve for future issues.

Mr. Magrath, in relinquishing his office makes a number of suggestions for perpetuating and enlarging the work he has commenced, and it is to be hoped that his detailed recommendations, which have most evidently been given mature consideration, will be followed.

Whatever may be undertaken in this way, we believe that a perusal of the Report will show that Mr. Magrath has himself contributed material data towards the meeting of the fuel problem of the future.

The net cost of the Fuel Controller's organization from its inception in June, 1917, to its disbandment in March, 1919, is estimated at $114,000, and we think the people of Canada for once obtained full value for the expenditure.

STANDARDIZATION OF MINING PLANT AT FRENCH COLLIERIES.

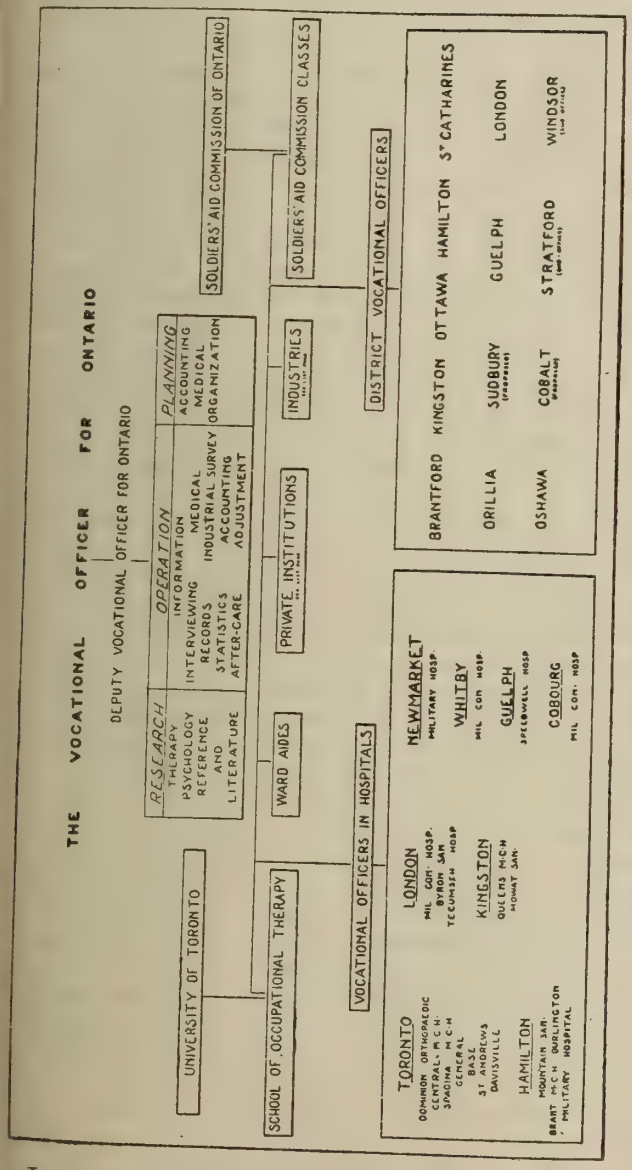
In France an effort is being made to profit by the opportunity afforded by the reconstruction of destroyed works to standardize all machinery, and especially mining plant. To this end a permanent commission has been appointed by the Ministry of Commerce.

The question of standardization has become a pressing one in all branches of industry, but in none more than in mining. There more than anywhere else the confusion due to want of uniformity is a hindrance to progress. The Central Committee of the Collieries of France has issued a circular calling attention to the need of uniformity, and gives a list of the things that should be standardized. This list includes nearly everything which goes to constitute a mining plant. The list has been submitted both to the users and to the makers of plant, with the request that they should consider the question and give their opinion thereon, so that an agreement may be speedily arrived at, and the work of standardizing taken in hand without unnecessary delay. The author of this paper is of opinion that it will be extremely difficult to arrive at an agreement which will meet the needs of all localities, and proposes a division into groups, with a standardization for each group, as a solution of the difficulty.—(Bulletin de la Societe de l'Industrie Minerale, First Issue, 1919.)

AUTO PRESENTED TO PROF. HAULTAIN.

Retiring Head of Vocational Work Honored by His Staff.

Toronto, June 19.—Five hundred members of Professor H. E. T. Haultain's vocational staff assembled at the Armories yesterday afternoon to present him with a touring car on the occasion of his retirement from the position of Vocational Officer for Ontario. The presentation was made the occasion of a striking tribute from those who had worked under the Professor and who expressed their keen regret that his active connection with the Ontario Vocational Branch of the Department of Soldiers' Civil Re-establishment had terminated. It was pointed out that over 92 per cent. of the male vocational staff in Ontario were returned officers and men, who had learned to look on the retiring chief as a personal friend.



Extent of the Organization Directed by Prof. Haultain.

In presenting the car on behalf of the members of the Ontario Vocational Branch, Mr. D. D. Eppes, head of the After-Care Department for Ontario, emphasized that Professor Haultain had earned the confidence of the disabled soldier and the respect and affection of his own subordinates. The speaker recalled that the retiring vocational officer had entered the re-training movement in its early days, and had seen it grow to its present day tremendous proportions. He paid tribute to the part the Professor had played in the development of the retraining movement, and lauded his sympathetic handling of the returned men. Professor Haultain, who was taken completely by surprise, accepted the presentation with a few suitable words.

The car is a very fine one—a McLaughlin Master 6, 45 h.p., Special, Special.

DEDICATION OF THE U. S. BUREAU OF MINES LABORATORIES.

The Bureau of Mines announces that during the week of Sept. 29 the new million dollar laboratories and workshops in Pittsburgh, Pa., will be formally dedicated. High officials of the Government, together with the Governors of the principal mining States and the leaders in the mining industries and miners' organizations, will be present to take part in the dedicatory ceremonies. A fetaure of the dedication will be a great national Safety-First meet, teams of miners from all over the country competing for cups and medals. There will be contests in rescue and in first aid to the injured, and as there is immense rivalry between the teams of the different mining companies, it is expected that these contests will take at least two days for decision. On Sept. 30 the elimination contests will begin at Forbes Field in Pittsburgh, and will continue until only the winning teams are left for the final championship contests, which will take place on Oct. 1 immediately after the elimination trials are completed.

The different laboratories of the bureau have been completely equipped for the investigation of the various problems relating not only to greater safety, but also to greater efficiency in the mining and metallurgical industries. Visitors will be invited to the electrical and mechanical workshops, and laboratories of the bureau and also to the petroleum, gas and coal laboratories, the testing gallery of the mine safety section, and the industrial gas-mask division. Another point of interest will be the experimental mine of the bureau at Bruceton, Pa., twelve miles from Pittsburgh, where an actual explosion of coal dust in the mine will be staged for the benefit of those attending. At the experiment station there is also to be shown a complete exhibit representing the mining and metallurgical industries of the country.

TRAIL SMELTING CHARGES — RECOMMENDATIONS OF COMMITTEE.

The Committee appointed to investigate the smelting charges of the Consolidated Mining & Smelting Co. at Trail, B.C., has reported to the Minister of Mines at Ottawa

The committee find that the application of schedule "B" has proved its general justification. It has brought about an improvement in the value and supply of ore, and a decrease in the cost of operation to such an extent that "the committee has felt warranted in asking the company now to act upon its undertaking to revise the existing schedule in favor of the producers of ore."

The committee suggests the appointment of a permanent committee, with functions similar to its own, to adjust future schedules.

Willet G. Miller and Canada's Mineral Resources

A United States Appreciation of Dr. Miller.

In "The Mining and Scientific Press," June 7th, there is published an interview granted by Dr. W. G. Miller, Provincial Geologist of Ontario. Mr. T. A. Rickard, who interviewed Dr. Miller, says editorially in the same journal:

"A short time ago we published an interview with Mr. Horace V. Winchell, a representative of the best type of American mining geologist; in this issue we give a similar interview with an equally worthy exponent of Canadian economic geology. Mr. Willet G. Miller is a stalwart Anglo-Celt, a big man physically and in character, a scion of the Viking breed, which has explored the far corners of the earth and carried the miner's pick in the vanguard of civilization. He is usually called Dr. Miller by reason of a double scholastic accolade, for he is a Doctor of Laws of Queen's University, where he taught, and also of Toronto University, his alma mater. He is one of those fortunate men whose services to the commonwealth have been recognized while they are still in the vigor of their manhood. Born in Canada of native-born parents, he typifies the traditions of a nation whose spirit was expressed with immortal eloquence during the War for Civilization. The interview tells the story of his life in a modest way. He would have said little if the interviewer had not cross-examined him with friendly persistence. His father had the tastes of a naturalist and from him he inherited the powers of observation which by academic training were developed into scientific research. While a student at college he early became a teacher also, the learning and the teaching being complementary and thereby fulfilling the true meaning of the word education—the drawing out of the mental faculties. His has been a fortunate career; early appreciated by his countrymen, he received an appointment, that of Provincial Geologist, for which he was well equipped, and then, by good luck, he had the chance of taking part in a mineral development of historic significance and industrial importance. Cobalt and Miller are names forever linked in honorable association. He appreciated the value of the discovery made in the course of cutting the grade for a railroad near Haileybury, in Ontario, and published a description of it almost immediately. The present writer, while editor of the 'Engineering & Mining Journal,' had the pleasure of printing that first account of the discovery at Cobalt in the issue of December 10, 1903. Although a cautious man—a trait inherited from his Scottish ancestors—Dr. Miller did not allow his scientific judgment to be stiffled; on the contrary, he came out boldly with the statement that "the ore is very rich, containing values in nickel, cobalt, silver, and arsenic; and a comparatively small vein could be worked at a handsome profit." In the 15 years since then Cobalt has produced 300 million ounces of silver. Dr. Miller has been amply justified in his forecast. He did more than that; he gave the miners in the Cobalt district a large measure of timely and practical geologic information; he did not wait until the mines were nearly worked out and then prepare a beautifully worded obituary notice or a highly scientific autopsy; he distributed technical data while he was collecting them in his official capacity and thereby gave to the exploration of the ore deposits an intelligent direction that ensured success. During the Cobalt boom, with its orgy of mine promotion and stock speculation, he did not lose his head nor endanger his integrity. While others became millionaires by following the advice he gave officially, he remained true to his duty. He might have enriched himself greatly, for he received many tempting offers to resign his appointment and accept both handsome retainers and profitable participation in attractive enterprises. It was all to no purpose; he loved his work and stuck to his post. His classification of the Cobalt rocks still holds good. From the start he expressed a preference for the silver veins in the conglomerate as distinguished from those in the schist and diabase; he also predicted that in passing from the Huronian conglomerate into the Keewatin schist the veins would probably become impoverished. These opinions have been confirmed by mining. Therefore our readers will note with keen interest his references to the unprospected regions of Canada. We publish a map in order to give additional point to his important statement. Experience, in Ontario particularly, has shown that the pre-Cambrian rocks constitute a terrain favorable to deposits not only of the precious metals but also copper and nickel. There is an enormous area of such rocks in Canada, particularly in the north and north-east. We desire to draw special attention to Dr. Miller's observations concerning the Hudson's Bay territory, which will be rendered accessible shortly by means of the railroad now under construction from the main line of the Canadian Pacific railway to Port Nelson. In these spacious sub-Arctic regions there remains, as Dr. Miller says, the most attractive unprospected area in the world. It is comparatively free from brush or forest and therefore open to exploration. We shall publish further information on the subject at an early date. At present the Sudbury ore deposits dominate the nickel market, but the chance exists that somewhere in this pre-Cambrian shield of the North there may be found other nickel lodes of comparable richness. The part that the Canadian nickel resources played in the War is well known, and it is noteworthy that Dr. Miller was foremost in organizing those resources for the use of the Allies. He gives expression to the international goodwill now sealed by comradeship in arms; indeed the unfortified boundary separating Canada from the United States is an outward and visible sign of a peaceful policy more eloquent than any Hague convention or Paris conference. If the rest of the world were as amiably disposed as the members of the mining profession in the two English-speaking countries of North America there would be no anxiety as to the maintenance of international amity. They are exchanging knowledge and co-operating in beneficent industry with the most hearty accord, and in this respect such engineers as Dr. Miller and Mr. Winchell are typical. The joint committee appointed recently by the Canadian and American mining institutes should serve further to promote good feeling, by taking prompt steps to remove any minor points of disagreement arising more particularly from the barbed-wire entanglements of tariffs and custom laws. One thing is sure, any American engineer going to Ontario will find Dr. Miller, Mr. Thomas W. Gibson, Mr. Reg-

inald W. Brock, and other men of their kind, only too glad to welcome them and to express their welcome by giving all the geologic information available. They may find the tall Doctor a bit reserved and non-commital at first, but when the crust of reserve has melted, they will find an inextinguishable warmth coming from a heart as big as his broad chest. Fertile in ideas, capable of wide generalizations, a good judge of human nature, shrewd but kindly, they will find a man neither easily deceived nor ever willing to deceive. His long legs are as much at home in the primeval bush as they are under the thwarts of a canoe; whether in the field or in the council-chamber, he is a born leader of men, and one whose leadership is accepted gladly. Alike as chief of an exploring party in the wilderness and as president of the Canadian Mining Institute in the city, he has won the confidence and affection of his fellows. Sentiment he has and the sense of humor, but most of all a willingness to help others. That characteristic has been evident throughout his life in Ontario, whether as student or teacher, geologist or official. He has trained a number of young men now honorably prominent in Canadian geology; he started them on careers of acknowledged usefulness. Honors have come to him, academic and professional, but no honor counts so greatly as the affectionate regard of the young men to whom he has given a helping hand. By his friends you shall judge him."

Final Report of the Fuel Controller

In viewing any results which the Fuel Control Organization may have been able to accomplish, the fact should not be lost sight of that the work was undertaken at a time when the country was passing through the greatest crisis in history, and financial, commercial and political conditions were in a state of flux. Concurrently with this trying situation, like a bolt from the blue came the winter of 1917-18 which has passed into history as one of the worst in severity with which the coal operators and transportation systems on this continent ever had to contend. The Fuel Control organization having been suddenly called upon to face such an emergency, was also handicapped in dealing with the situation by a lack of adequate data regarding the distribution and consumption of coal in Canada.

Notwithstanding these and other adverse conditions, Canada's importation of anthracite for the coal year ending March 31, 1918, was 600,000 tons in excess of any other year; while the importation of bituminous coal exceeded that of the previous coal year by 4,000,000 tons. After three years of war, Canada had reached its maximum effort: hence the need for these excess tonnages was imperative and fully recognized as such by the United States Fuel Administration.

The efforts of the country to obtain its supplies from the United States, in the second year of the Fuel Control organization, were proceeding very satisfactorily up to the time the armistice was signed in November, 1918. At the end of that month, the imports of anthracite from the commencement of the coal year, April 1, were 177,414 gross tons in excess of the tonnage received for the same period in 1916, the year adopted by the United States Fuel Administration as the anthracite basic coal year, while the imports of bituminous were 3,371,243 net tons in excess of the tonnage received for the same period in 1916. With the conclusion of the war, and the closing of war industries, in the middle of December, the outlook had changed completely, and an abnormally mild winter finally disposed of "the coal situation."

The annual production of coal in net tons within Canada during each calendar year in the period of the war was as follows:

1914	13,637,529
1915	13,267,023
1916	14,483,395
1917	14,046,759
1918	14,979,213

Not only was the tonnage of coal secured from all sources sufficient to meet the needs of the country as a whole, but also, its distribution was effected in such a way as to provide adequately for individual requirements. In fact, although Canada has on the whole an extremely cold winter climate, it is safe to state that in no country with similar fuel requirements was there as little suffering or inconvenience during the war period, as in this country. Taking into consideration the distances separating the consuming areas in Canada from the mine fields, and the cost of production in Canadian mines, the prices of coal compared favorably with those in other countries.

Prices of coal, whether of foreign or domestic origin, under the coal regulations were fixed on a basis of actual cost plus a reasonable net profit. The following table shows the great expansion in Canadian Export trade during the period of the war annually for fiscal years ending March 31, in:—

1913	$ 393,232,057
1914	478,997,928
1915	490,808,877
1916	882,872,502
1917	1,375,758,148
1918	1,589,661,195

A reference to the report on "The coal trade of Canada," just published by the Dominion Bureau of Statistics, will show that Canada's consumption of coal has not kept pace with this industrial expansion, which points to the conclusion that Canadian manufacturers have been obtaining greater efficiency out of their coal, as well as making greater use of the country's water powers.

In conformity with the policy of statistical co-ordination, recently adopted by the Government, the statistical data of the Fuel Control organization, bearing on the production, importation, and distribution of coal, at the termination of Fuel Control on the 31st of March, 1919, is to be turned over to the Fuel Section of the Dominion Bureau of Statistics. These data will form the nucleus for further investigations, and should occasion require, an amplification of the work can be undertaken at short notice. The statistical material covering the coal year ending March 31, 1918, is being published by the Bureau in a report headed, "The Coal Trade of Canada," which it is hoped will be followed by annual reports of a similar nature.

The Oil Concession Correspondence

(Continued from issue of June 25, 1919.)

Memorandum Extending Interview With Hon. Arthur Meighen.

The first question is whether it is in the best interests of a great country having important potential oil deposits to give licenses to a multitude of small enterprises to exploit sections here and there, and to sink wells wherever some indication of the presence of oil is found; or to undertake, under competent management, search for and exploitation of oil-deposits over a very wide area their main sources being traced and the oil being extracted, refined and brought to market under an economical and conservative system.

In searching for a deposit of petroleum under lands which have not already been submitted to the drill it must be borne in mind that as the location of the main deposit may be at a depth below the surface of a quarter of a mile a search for outcrops and other indications is required at very serious distances apart, a process which calls for a number of surveyors and geologists to record and locate various indications, and for an extended time in which to make the search as well as to correlate the facts observed and deduce therefrom the probable location of the deposit.

The object of such an examination is not to find oil in comparatively small quantities, but to locate the main anticlinal or backbone of the deposit and to find out from surface and other indications where the deposit is within reach of a drill hole and where it sinks to an unreachable depth.

The working of a subsidiary anticlinal is wasteful and entails, if due care be not taken, the danger of the swamping with water of a larger area.

Dealing with a liquid which calls for the special creation of the facilities for raising, storing and transporting it, is entirely different from dealing with a solid, the storing and transporting facilities for which are already in existence and are exchangeable as between solids. This detrimental quality of a liquid requires an estimate of quantities to be handled to be made in advance of the creation of the facilities, otherwise the wastage of capital is enormous.

The supply obtained from wells is an irregular, but constantly decreasing quantity, so that even when sufficient oil is obtained to place the venture on a working basis continued research is needed to follow the extension of the field and secure maintenance of the output without which the large expenditure required for transport, treatment and distribution is unwarranted.

Oil ventures may be divided into two classes, namely, those which are conducted on a small scale and those which have higher ambitions with the hope of finding a sufficiency to supply, firstly the local demand, and should there be an excess, to create an export trade for the benefit of the country owning the fields. It is with this larger purpose in view that the "Shell" Group would propose to proceed. It is obvious that the geographical position of the Alberta fields would call for very large expenditure, which should production in their opinion warrant it, would be cared for by the "Shell" Group.

A comparison may here be drawn from actual experience between undertakings aiming at a business on a large scale which must naturally really have sufficient area at its disposal to warrant the necessary disbursement and the wasteful and damaging method of confiding the exploitation of small areas to numerous parties.

A glance at the maps of California, Roumania, Pennsylvania, Texas and elsewhere showing the division of fields, into small lots and the location of the boreholes thereon will forcibly bring home the following conclusions:—

Where this system prevails the number of boreholes put down is grossly excessive, each owner endeavouring by placing his boreholes as near as the law will allow to the boundary line, to draw oil from his neighbour's territory, with the result that from 10|20 times the number of boreholes no more, and possibly considerably less oil, is gathered than would be obtained from a smaller number of holes scientifically placed on previously ascertained geological information.

It can be no part of the policy of the Dominion Government to foster the excessive cost of bringing to the surface a deposit which is a national asset if properly worked.

Apart from the excessive cost of production thus entailed bankruptcy and ruin to thousands of people may result from the gross speculation which arises when a presumptive oilfield is first located. The oil boom in Texas is an example of this trouble, while it has been repeated in Galicia, Roumania, elsewhere in the United States and in other countries.

In 1901, when the Lucas well was struck in the neighbourhood of Spindletop, Texas, speculators acquired rights on plots which were divided up into infinitesimal lots, and some hundreds of companies were formed for the working of single wells or areas only sufficiently large to take a very small number of wells.

Perhaps 80 or 90 per cent. of these companies were pure swindles, entailing ruin to those who invested in them. After a year or two the surviving companies fattened on the losses of those which have gone under, and this procedure has been followed elsewhere. Looked at from the point of view that an oil deposit is a national asset, it is deplorable to consider the waste of petroleum which results from this sub-division and working of the lands. Undoubtedly a large deposit of oil was found in Texas and gigantic quantities were brought to the surface within a few months, quantities which were far in excess of the reasonable demand, resulting in the value of the oil at one time falling to 2 cents or even 1 cent per barrel, while enormous quantities, values being so low, were allowed to run to waste.

Had such a deposit been in the hands of a large and responsible company capable of properly working it the oil would have been brought to the surface so as to emit reasonable requirements, and the production consequently spread over a number of years.

As it happened the wastage of capital cost and the wastage of the product obtained were almost criminal, while by reason of careless or inexperienced drilling the quantity left in the ground and probably

yet unobtainable, is a larger percentage than it should be.

Scientific work means the obtaining of the largest possible percentage of the deposits for human use whereas unscientific work fails to obtain so large a percentage of the actual deposit.

It may be urged that granting the necessity for search over a larger area the area required for eventual exploitation ought to be much smaller.

The area required for search should be the largest possible, but will be reduced by stages.

Geological indications referred to above will be utilized merely as facts from which to deduce the location of a deposit, and the large majority of these indications will be found where the territory would be valueless for drilling purposes.

After arriving at a rough idea of the location of the main deposit certain areas would be marked for more detailed geological investigation, and the balance would be no longer required. This extended geological examination would again lead to the giving up of further portions, and these smaller portions only would be retained for the purpose of exploitation, and would be confined to those grounds where the mineral rights are still retained by Government.

As an instance of this procedure an area of about 200,000 square miles reserved for such search in an undeveloped country resulted in the provisional retention of plots covering only about 2,000 square miles. Further examination resulted in the retention of only about 800 square miles, and a portion of this area may still be returned to the Government concerned as not likely to be petroliferous. The concession for search was granted in the year 1912, the first rejection took place after four years, and the second rejection has been gradual from that date to this.

As a contrast to the instance given of Texas, references may be made to the success of the "Shell" group where considerable tracts have been placed under their control and worked on scientific lines.

Borneo.—An area exceeding 600 square miles has resulted in the valuable portions of it being reclaimed from jungle and a production of something like 800,000 tons per annum, bringing a revenue to the potentate many times greater than he had ever dreamt of.

Sarawak.—The whole of Sarawak, covering 50-60,000 square miles, has been confided to the Group for the purposes of oil production. This British territory is now fast growing into a valuable asset to the Empire, and would have progressed at a greater pace had it not been for the war and the undeveloped nature of the district which called for the creation of a harbour and other necessary facilities.

Mexico.—The area at the control of the Group is large, the production enormous, but expansion has been seriously delayed by reason of the war.

Egypt.—The phenomenal success obtained under the Group's control and arising out of a field discovered by their experts and previously unknown, is a tribute to their attainments and has been freely acknowledged in the recent report of the Financial Advisers Egyptian Budget, 1917.

The proposal put forward by Colonel Shillington was founded on terms and conditions arranged by a subsidiary of the Group, with the Governor of Trinidad and Tobago under the auspices of the Crown Agents for the Colonies in Whitehall varied only by the different conditions which prevail and the different knowledge of the underground conditions which in the case of Canada call for a period of search and exploration which had previously been expended on Trinidad, but after hearing Mr. Meighen's views the Group are prepared to negotiate on the lines set forth in this memorandum.

It may not perhaps be necessary to refer here to the financial powers of the Group, but occasion is taken to send herewith copies of the last Balance Sheet of the "Shell" company, and copies of the speech of the Chairman at the last Annual General Meeting, which may probably be sufficient to cover this point.

The second question now arises:—

If it be admitted that exploration and exploitation of oil deposits may most advisedly be carried out over a wide area, and under special terms, what returns and guarantees do the Government receive in consideration for the concessions granted by them?

It is suggested that the Dominion Government may feel justified in confiding to the "Shell":—

(1) the search for a deposit.

(2) the geological exploration,

and (3) the eventual exploitation on something like the following terms:

(1) The Group will provide the personnel, the technical knowledge and the management of the whole undertaking.

(2) The Group will provide the funds necessary for the above work, receiving as interest for their advances a cumulative preferential interest at the rate of 6 per annum, and as security to the Government for the due working of the property will be content only to receive this interest out of the earnings.

(3) The Group will operate the properties on behalf of the Dominion Government, receiving as renumeration for the provision of funds, and for their care and control, half of the net profits arising from the venture, the other half belonging to the Government, thus affording the Canadian people through the Dominion Government a direct interest in the undertaking.

(4) The venture to be free from import and export duties; from Dominion and Provincial and Municipal taxation; and to receive the existing bonus on oil produced.

(5) The venture to be assured by the Government of all trading rights, way leaves, and generally to receive the reasonable support of the Government in its operation,

(6) Should the Dominion Government so desire a Canadian Company would be formed on which a minority representation by the Government would be cordially invited.

The rough scheme is devised with the object of allowing the production of oil at the lowest possible cost, a condition which is required by reason of the geographical location of the expected field being unfavourable for export purposes, while the production is hoped to be largely in excess of the local demand; moreover, the climatic conditions, especially in the northern part of the territory would seem to call for expenditure largely in excess of the usual. The power to produce oil at a low level of cost is one which should seriously strengthen the position when in due course values fall to a normal level ,and would place the venture in a favorable position as compared with competing producing countries.

The area for search should be that portion of the Province of Alberta lying north of the Athabasca river, and that portion of the North-West Territory between longitude 110° and 125° W., bounded on the north by latitude 630°.

The area for close geological examination to be selected from the above by the Group without injury to already existing rights.

The area for exploitation to be selected by the Group, but confined to ground the mining rights to which are now held by the Province or Dominion Government.

Should the Group find it desirable to acquire rights within the exploration area already granted to other parties they shall be considered as part of the general venture.

A Night Lettergram.

Edmonton, Alta., Nov. 23, 1918.

Hon. Arthur Meighen,

Winnipeg Telegram twenty-first, states shell oil company England has absolute rights for a number of years to all oil properties lying in Canada from the Eastern side of the Rocky Mountains and International Boundary line to the Arctic Ocean, and that order-in-council going through. Is this true? Number of companies now operating have attended me protesting against such measures. Please send draft bill before taking final action. Please wire.

H. A. MACKIE.

"The Winnipeg Story."

"A wild rumor is in circulation here to-day to the effect that Sir Robert Borden, Premier of the Dominion, has delivered to the Shell Oil Company of England, for a consideration, absolute rights for a number of years, to all oil properties lying in Canada, from the eastern side of the Rocky Mountains and from the international boundary line to the Arctic Ocean."

"After this term of years has elapsed, the Shell Oil Company is to choose ten per cent. of the productive oil lands, the rest to be sold to purchasers. All the existing oil rights at this time are to be expropriated the company on a purchase basis for the amount of money already spent on the properties in development."

"The right, it is said, was given by Sir Robert just before he sailed for Canada. An Order-in-Council covering the sale, will soon be put through, it is declared.

"The Shell Oil Company controls oil wells in Persia, Mexico and other countries. It supplies the British Navy with material.

"Rumour has it that the Standard Oil Company, approached the Premier, making a bid for this huge concession, but the Shell Oil Company bid a little higher."

"If the story is true, then the deal will be one of the largest in history, as this vast aggregation of capital will acquire control of something like 75,000 square miles of territory."

Hon. Mr. Meighen Says No Such Step Taken.

Ottawa, 25th November, 1918.

H. A. Mackie, M.P.,
Edmonton, Alta.

Your wire re paragraph in Winnipeg Telegram received. Government has taken no such steps as intimated in your message. A. MEIGHEN.

Calgary, Alta.,
30th November, 1918.

Hon. Arthur Meighen,
Dear Sir,—

Under date of November 21st, 1918, an article appeared in the Winnipeg Telegram stating "Rumor says Canadian Oil Lands taken; story has it that Sir Robert Borden delivered absolute rights to Canada Oil Territory to English Company, etc."

I have received inquiries asking me if there is any truth in this. I would be obliged if you would look at the article, and if there is any information you can give me I shall be glad to receive same.

(Sgd.) T. M. TWEEDIE.

Ottawa, Canada,
7th December, 1918.

Dear Mr. Tweedie,—

I have to acknowledge yours of the 30th regarding a paragraph which appeared in the Winnipeg Telegram under date of the 21st ult. I have received several communications respecting this, and have told my correspondents that no such action has been taken by the Government as that indicated in the paragraph referred to.

(Sgd.) A. MEIGHEN.

G. N. W. Telegraph.

Peace River, Alta., 2-3.

W. A. Cory,
Deputy Minister Interior, Ottawa,

Edmonton Bulletin twenty-fifth and Winnipeg Telegram twenty-first, have articles saying Government passed Order-in-Council disposition of oil rights in Canada covering leases and developed properties Peace River leases. Much excited. Please wire me regarding same, as it has paralyzed oil business here in meantime; cannot credit it.

J. J. RUTLEDGE.

Ottawa, 3rd December, 1918.

J. J. Rutledge, Esq.,
Peace River, Alta.

Wire received. Government has taken no such steps re oil rights as indicated in Winnipeg Telegram.

W. W. CORY.

Peace River, Alta.,
Dec. 3, 1918.

Hon. Minister of the Interior,

Persistent rumor here that all oil leases in Northern Alberta to be cancelled; as this is of vital importance interest here, please wire as full information as possible.

L. W. BROWN,
Sec. Peace River Unionist Ass'n.

Ottawa, Dec. 3, 1918.

L. W. Brown, Esq.,
Secretary, Peace River Unionist Ass'n.
Peace River, Alta.

No such action as suggested in your wire being considered by the Government.

A. MEIGHEN.

December 16, 1918.

Hon. C. W. Mitchell,
Provincial Secretary, Province of Alberta.

Dear Mr. Mitchell,—

Mr. Cory has communicated to me your request to be furnished with a copy of the memorandum of Sir

Reginald MacLeod and Mr. Benjamin, dated 13th July last, making certain proposals regarding oil development in Alberta, and northerly in the N. W. T. I am enclosing a copy of the memorandum herewith. I may say that no action has been taken on these proposals, and there are certain features of them, which in my judgment, could not be accepted.

Under present conditions the responsibility of course for the disposition of this subject is with this Department, but I would be glad to have, in an informal way, any general views you may care to express.

(Sgd.) ARTHUR MEIGHEN.

Dec. 6, 1918.

H. H. Rowatt, Esq.,
Controller of Mines,
Department of the Interior,
Ottawa.

Dear Sir,—

We wish you would inform us what effect, if any, the enclosed statement, which is copied from the Edmonton Bulletin of the 28th day of November, 1918, will have on the leases held by the Athabasca Oils, Ltd.,

(Sgd.) F. JOHNSTON.

Ottawa, Dec. 21, 1918.

Sir,—

I beg to acknowledge the receipt of your letter of the 6th instant, enclosing a copy of what would appear to be an extract from the "Edmonton Bulletin" of the 28th ultimo, in which the statement is made that for a consideration absolute rights to all petroleum properties in Alberta have been granted to a company, together with the right of expropriation.

In reply I beg to inform you that this Department has no knowledge of the grant referred to in this newspaper item. It would appear, however, that in case such a grant were made it could not effect rights which have already been disposed of by the Crown under the provision of the regulations, and which rights are still in good standing.

(Sgd.) H. H. ROWATT,
Controller.

Edmonton, Dec. 26, 1918.

Dear Mr. Meighen,—

I have had forwarded to me, by the Hon. Mr. Mitchell, a copy of a proposal b ythe Shell people for concessions in Northern Alberta.

While I should be very glad to induce capital to come in and develop our North Country, I am unalterably opposed to the granting of a large concession to any private individual or corporation in order to get them to do so.

(Sgd.) CHAS. STEWART.

Toronto Branch Canadian Mining Institute, Asks Questions.

The Canadian Mining Institute,
Toronto Branch,
January 14, 1919.

The Honourable, The Minister of the Interior,

Dear Sir,—A statement has recently been appearing in the Canadian newspapers and periodicals to the effect that the Shell Trading and Transportation Company, Limited, has applied for an exclusive concession of a large block of land in Alberta, on which to search for oil and possibly for other minerals, and that the Government of Canada is considering the application, and that a decision is expected soon.

Members of the Canadian Mining Institute, at a meeting held in Toronto on Saturday, January 11th, appointed us a committee to ask you whether such an application has been made to you or to the Government, of which you form a part, and if so what are the terms and conditions of the application.

Trusting that you will favour us with an early reply containing the information asked for, so that we may submit it to a meeting to be held on Friday the 17th instant.

(Signed) J. B. TYRRELL,
REGINALD E. HORE,
H. L. KERR.

Ottawa, January 16, 1919.

Dear Mr. Tyrrell,—I am in receipt of your favour of January 14th, with reference to certain statements that have been appearing in Canadian publications to the effect that the Shell Trading and Transportation Company, Limited, have applied, and are securing, an exclusive concession of a large block of land in Alberta. It is true that this company has submitted certain proposals to me, but they were refused. Another one of an entire different character has been submitted, but I cannot, in its present form, recommend its acceptance. The question has never been considered by council, largely because the question of the Natural Resources for the Western Provinces was up for consideration. I might add that it is not the policy, nor would it be reasonable, to expect this Department to submit the nature and terms of any application addressed to the Department before it had even been brought to the attention of the Ministers of the Government. I am sure you will agree with me in this.

A. MEIGHEN.

January 21, 1919.

The Honourable, The Minister of the Interior,

Dear Sir,—We beg to acknowledge receipt of your letter of the 16th of January, and to thank you for the information that the Shell Trading and Transportation Company, Limited, submitted certain proposals to you, which were refused, and that another proposal from the same company is now before you.

We would strongly urge you to submit the proposals of the company to the members of the Canadian Mining Institute, or at least to a committee appointed by the Institute, for consideration and criticism. The Institute is composed of mining men from all parts of Canada, men who are acquainted with the mineral resources of the country better than others, and who are vitally interested in the success of the mining industries. The great mass of technical knowledge, judgment and executive experience possessed by our members is at your disposal if you care to use it, and we would press upon you the advisability of making full use of it.

The Toronto members of the Institute will meet again on Saturday next, at which our Committee will report, and we should take it as a favour if you would send us a further reply by that date.

(Signed) J. B. TYRRELL,
REGINALD E. HORE,
H. L. KERR.

Ottawa, 23rd January, 1919.

Dear Mr. Tyrrell,—May I in Mr. Meighen's absence acknowledge your letter of January 21st, in which you suggest that the proposals of the Shell Trading and Transportation Company, Limited, should be submitted to the members of the Canadian Mining Institute for consideration and criticism? You are probably aware that a Minister of any Department would hardly be justified in submitting data of this character to the public before the data was even submitted to the members of Council and before the Government as a whole had an opportunity of giving them any consideration whatsoever. Mr. Meighen has not felt disposed to accept favourably any application from this company, and in consequence would not be in a position to place them in your hand. He will be absent from Ottawa for a week or two, but I felt that in his absence I should submit the statements above and as well add that I shall be very pleased to bring your further letter to his attention upon his return as well as a copy of this reply.

Toronto, Ont., January 28th, 1919.

The Honourable, The Minister of the Interior,

Dear Sir,—Re Shell Trading & Transportation Company, Limited.

We beg to acknowledge receipt of the letter of the 23rd inst. from your secretary, Mr. Mitchell.

On Saturday last the 25th inst., a meeting of the Toronto Branch of the Canadian Mining Institute was held here and the communications which have passed between us were submitted to that meeting. After some little discussion the following resolution was proposed and passed unanimously:—"That in communicating with the Minister of the Interior this Committee should accede to his position that the information sought should not be disclosed prior to its submission to Council, but that the Committee make clear to him that the position of the Canadian Mining Institute is that no contract be closed with any person ((except on the terms of the Regulations of the Department, after due publication thereof), except after being furnished with the opinion and analysis of the Institute upon the proposal about to be acted upon, and that the Committee emphasize to the Minister that any communication made by him to the committee shall be held as confidential until the proposal is disposed of by the Government."

This Institute is the natural guardian of the mining interests of the Dominion, and, on account of the knowledge and experience possessed by its members, is the proper judge of what should be done to promote the welfare of the mining industry, and of what should not be done to hinder and disturb it.

We would therefore urge you to accept the good offices of this Institute, and to decline to make a final extraordinary contract with the Shell Trading and Transportation Company, Limited, or with any similar Company, before you have submitted the proposed contract to this Institute for its approval.

(Signed) J. B. TYRRELL,
REGINALD E. HORE,
H. L. KERR.

Ottawa, Ont., January 31st, 1919.

Dear Mr. Tyrrell,—I am in receipt of your favour of January 28th, and have, as well, reviewed the previous correspondence.

There is no information I am at liberty to give in the matter, other than that contained in the letter of my Secretary of the 23rd inst. I fear the acceptance of the principle you advance, that any separate body is the natural guardian of the mining or other interests in the Dominion, in such a way as to involve submission of all matters affecting such interests to that body for approval, would, if generally applied, lead to far-reaching and unnecessary difficulties. The practice stated in my Secretary's letter is, I think, the invariable practice, from which I would not be justified in departing.

This letter is in no way an evidence of failure to appreciate the work of your institute. On the contrary, I would be glad at any time to give the closest attention to any representations submitted to me on behalf of that institute.

A. MEIGHEN.

Toronto, Ont., February 11th, 1919.

The Honourable, The Minister of Interior:

Dear Sir,—We beg to acknowledge receipt of your favour of January 31st, which was laid before a meeting of the Toronto members of the Canadian Mining Institute on Saturday last.

After full discussion, our Committee was asked to point out, in reply to your letter, that we have not asked that "all matters affecting such (mining) interests" should be referred to the Institute, but merely such matters as it is proposed to dispose of by special Order-in-Council, and without regard to the present Mining Regulations. We do ask that before your Government takes any extraordinary action in disposing of mining rights in public lands it should consult those who have made a life study of the mineral resources of Canada, and who are consequently the best men available to advise on the proper action to take in emergency legislation, and we have no hesitation in saying that all such men are included in the membership of this Institute.

The experience of the past few years has emphasized the value of technical knowledge in dealing with technical subjects. Other Governments, such as those of England and the United States, have made free use of technical advisers experienced in managing and financing mining enterprises, and even our own Government, in other lines of industry, has endeavoured to avail itself of technical advice, but in Mining, which is, next to agriculture, the greatest productive industry in the Dominion, the special knowledge and experience possessed by the men of our profession has not been effectively used.

As citizens of Canada we are anxious to promote the welfare of the Dominion along the line in which we have the fullest knowledge and widest experience. We offer you that knowledge and experience freely in order to place you on an equal footing with others with whom you may be called upon to deal, and who have already secured the best technical advice that they are able to employ.

We fear that the Government is likely to make a bad bargain for Canada if it does not use the special knowledge which the members of the Canadian Mining Institute possess, and we feel certain that the country will be in sympathy with us when it understands the position we have taken.

However, we sincerely hope that you will not allow the Government to be drawn into a secret bargain for the disposition of our mining lands, but that, if an offer or proposal should be made to you to take over mining rights on certain conditions that might seem to you to

be beneficial to the country at large, you will consult this Institute, or at least a Committee of its members, for whose knowledge and disinterestedness it can vouch, before you decide on any definite course of action which would bind the country.

J. B. TYRRELL,
REGINALD E. HORE.
H. N. KERR.

February 14th, 1919.

J. B. Tyrrell, Esq.
Toronto, Ontario.

Dear Sir,—Answering your letter of 11th February, I can only say that while departing in no way from the terms of my letter of 31st January, I quite concede the necessity of being advised with regard to technical subjects by those having technical knowledge, and the desirability as well of having the views of an organized body of professional men such as the Mining Institute, on questions relating to mining.

A. MEIGHEN.

(*Continued in Next Issue.*)

THE COAL MINES OF MACEDONIA.

In Macedonia coal in abundance is found in the valleys, appearing above the surface in many places. In the valley of Kossovo, in the neighborhood of Sibovtzi and Hade, along the Sitnitza River to the south-west of the town of Prishtina and around the village of Shashkovitza, in the northern extreme of the valley to the southwest of Prishtina, the coal deposits are extensive and valuable. The layers are usually about 4 3-10 ft. thick, with a northeasterly direction, almost horizontal, and showing above the ground, in some places, the distance of a kilometre. The Serbian railways were formerly supplied with coal from this particular region. In the basin-like valley of Prizrend coal also appears above the ground in layers averaging 2 ft. thick. The same condition is found in the narrow valley of Piscupshtina River in the environs of the villages of Lukovo, Perezi, and Berovo up to Mercybev in the Ochrida district. In these particular localities the surface layers average in thickness from ¾ of a foot to 4.35 ft., but this coal has only a local value, as it is far from the railway.

In the Pelagonian Basin coal is also found in the outskirts of Seletchka mountain towards Prilep, Suhodol, and Jivonia. On the Teherna River, in the near distance, are layers from 3.25 to 6.75 ft. thick.

While peasants were recently digging a well near the village of Tzaridvor, in the Ressen Valley, coal was found 16 ft. from the surface: the vein, however, was but 2.25 ft. in thickness. Enough coal has already been found in this particular locality to supply the entire neighborhood, and in all probability there are other and greater deposits not yet located.

In the districts around Skopie coal is found in quantity and of very good quality, the veins being from 2 to 3 ft. in thickness. In the vicinity of Bardovtzi to the west of Skopie, the same kind of bituminous coal is found; as also in the neighborhood of Kitchevo.

Macedonia is undoubtedly rich in coal, but proper measures have never been taken to locate the deposits, or to work intelligently the veins. In the opinion of the United States Consul-General at Sofia, Macedonia under friendly rule will present a most promising field for the investment of capital and the development of its natural wealth.—Journal Royal Society of Arts.

Jones & Glassco, Reg'd., announce the appointment, as their Toronto representative, of Mr. P. M. Laing, recently Toronto branch manager of Herbert Morris Crane and Hoist Co. Mr. Laing has had broad experience in the engineering field, particularly as applied to transmission appliances and equipment, having been for a number of years connected with the Positive Clutch and Pulley Works, and also the Elmira Machinery and Transmission Co. This experience, combined with several years' architectural, engineering and industrial study of applications serving a wide clientele, has earned for him a highly respected connection both in Toronto and throughout Ontario. A call at the Toronto Office, located at 1203 Bank of Hamilton Building, will find Mr. Laing ready to respond to all enquiries of the well-known firm of Jones & Glassco, Reg'd., in the power transmission field.

Recently Toronto Branch Manager of Herbert Morris Crane & Hoist Co., now appointed Toronto Representative of Jones & Glassco (Reg'd), Power Transmission Specialists.

The Marquis of Queensberry has returned to London and reports having acquired large oil and other interests in the Peace River district.

Oil Notes

DRILLING FOR OIL IN NEW BRUNSWICK—ENCOURAGING RESULTS.

By courtesy of Mr. Matthew Lodge, of Moncton, the JOURNAL is able to corroborate the reported oil strike in New Brunswick referred to in our issue of the 18th of June (page 424.) Well No. 18 is in oil sand at a depth of 2,662 feet, the drill having penetrated some 40 feet of sand. The well flowed intermittently for some hours until it was shut in, the pressure sending the oil over the top of the derrick. The pressure blew the capping off, and considerable oil was lost.

The D'Arcy Exploration Company, a syndicate organized by the Anglo-Persian Pil Company for exploration purposes is now drilling three holes at different parts of the province, one at Port Elgin, one near Buctouche, and one at Coal Branch on the Canadian Government Railway. These are test wells, and it is the intention of the Exploration Company to explore the whole province in a similar manner.

The Syndicate also controls the large shale deposits in Albert & Westmorland counties, under option, and developments may be shortly anticipated. The work of exploration is under the direction of Dr. J. A. L. Henderson, who is the Technical Adviser of the New Brunswick Gas & Oilfields Co.

Those who are interested in the work of exploration express themselves as being very much encouraged in regard to the future oil situation in New Brunswick.

PROF. GWILLIM TO INVESTIGATE PEACE RIVER OIL PROSPECTS.

Blanket Concessions Objected to.

Vancouver, June 21.

Professor J. C. Gwillim, Professor of Mines at Queen's University, Kingston, has been retained by the Provincial Government for special duties under the provisions of the Coal and Petroleum Appropriation Act, passed at this year's session of the Provincial Legislature. This announcement was made by Hon. T. D. Pattullo, Minister of Lands.

Professor Gwillim will make a detailed investigation of certain lands in the Peace River section, upon which a reserve has been placed by the Department of Lands, for the purpose of testing the presence of oil in commercial quantities. It will be recalled that under the Act above named an appropriation of $50,000 was made to be expended by the Department of Lands to aid in the development of coal, petroleum and natural gas lying under Crown lands.

For some considerable time past Professor Gwillim has been retained at frequent intervals by the Dominion Government in connection with geological survey work, while he is well known as a mineralogist throughout Canada. He has also carried out very important missions for the Department of Natural Resources of the Canadian Pacific Railway Company.

A substantial "strike" in the Peace River country would advance the development of the northern central section of British Columbia very considerably. It will be realized, however, that the Province cannot afford to adopt a policy that creates a monopoly of any of its natural wealth, and no blanket concessions should be given. If oil is found it should be a valuable discovery; if it does not exist in commercial quantities the public will have reliable information as a protection against the wild-catter. So in any case the experimental legislation passed at this year's session has a double value.

THE DISCOVERY OF OIL IN DERBYSHIRE (ENG.)

In the British House of Commons, Mr. Kellaway (Deputy Minister of Munitions), in answer to a question, said he was glad to be able to inform the House that the borers had struck oil at Hardstoft. This was one of the areas being tested by Messrs. Pearson for the Ministry of Munitions, in connection with the Government's oil development scheme. The work was commenced in March, and on Tuesday of last week a depth of 3,075 feet had been reached, and traces of oil were found, and when the work was resumed the next morning the oil rose raidly to a height of 400 feet, and boring had to be stopped to ensure the oil being kept under control. The oil, he was advised, was of light gravity and of good quality, but the oil-bearing rock had been penetrated only a few inches. It would be a mistake to have any sanguine expectations on what had occurred, but the experts in charge of the works expressed themselves as satisfied with the prospects of this first serious effort to explore the oil possibilities of the country. He desired, on behalf of the Government, to congratulate Lord Cowdray and his staff, and Sir John Cadman and the petroleum executive, who had shown great energy and determination in connection with the work, in spite of sceptical criticism. So soon as he could, he would give full information as to the progress made.

At a later date Mr. Kellaway stated in the House that the oil at Hardstoft had reached a height of about 2,400 ft. and was rising at the rate of about 340 feet a day. Sir John Cadman, in the course of an interview, has remarked that the prospects were very good. Great credit is due to Dr. Veatch, the American geologist, Mr. Crandall, and Dr. Hackford, Lord Cowdray's chief chemist, all of whom reasoned from the geological and chemical aspect and advised a trial bore at Hardstoft. Though it was impossible even now to say whether oil was present in commercial quantities, the results showed that they were justified. "If this were in the United States," he continued, "there would be a 'boom,' wells would be sunk all over the place, and the map would be changing hands every day. Fortunately the Government controls drilling, and that cannot happen in this country. Meanwhile we have got to get a definite policy, and that is receiving Cabinet attention. Whose oil is it and how is it going to be worked? Those are questions the Cabinet is deciding. Meanwhile control has passed from the Ministry of Munitions to the Petroleum Executive, and work is proceeding on the lines already started. The oil is a true paraffin base oil of very high quality, with 10 per cent. petrol, 40 per cent. kerosene, and the balance is made up of lubricating oil, gas oil, and fuel oil. This sample has all the characteristics of high-grade crude. On the whole the results justify the investigation, and are a triumph for scientific reasoning."

Nova Scotia Notes

Inverness Coal & Railway Co.

The National Trust Company has given notice in the Supreme Court of Nova Scotia of its intention to foreclose the mortgage of the railway property of the Inverness Coal & Railway Company. Mr. John McGillivary, who was General Manager of the company for some years, and has latterly been acting as Receiver, has resigned, and the Court appointed the Eastern Trust Company as Receiver in his stead. The motion came on for directions as to procedure—whether it would be advisable to close the Inverness Colliery entirely, or to keep it pumped out until it was sold. The Chief Justice suggested that as important interests were involved the motion should be adjourned until July 29th, and that the Commissioner of Works and Mines of Nova Scotia and the Minister of Railways should be advised of the nature of the motion.

This is very serious news for the people of Inverness County, where the production of coal has shown a steady decline for many years past. The output of the Inverness Colliery for the past few years has been as follows:

	Gross Tons.
1915	245,749
1914	264,842
1913	293,447
1916	265,427
1917	202,719
1918 (approx.)	200,000

The mine workings, which are on the seven foot seam only, are entirely submarine. The face of the slope is about 7,000 feet from shore, and the dip off the measures is varyingly steep.

The Mabou Mine and the Port Hood Mine were flooded by inbreak of the sea some years ago, and Inverness is, and has been for some time, the only producing colliery in Inverness County, with the exception of a small output which is being obtained from crop workings above sea-level near Port Hood.

Inverness County coal, while not particularly suitable for metallurgical processes, is a favorite house coal, being free-burning, and when screened a clean bright coal suitable for steam raising and open grates.

It has never been demonstrated that the Port Hood mine is irrecoverably flooded, and that there is good reason to believe that the influx of water which closed the mine did not enter by a direct overhead break from the sea-floor, but was the accumulated result of percolations through the partings of the strata where they emerge from the sea between high and low water mark. In any case, the feasibility of again working the mine could only be tested out by a company well furnished with capital and equipment.

There is an undeveloped land area of coal north of Inverness, known as the Ste. Rose areas, which might be capable of commercial operation if they were connected with the railway, and the purchase of the properties were effected at a reasonable price.

The only prospect for the coal industry in Inverness County as a reasonable success would be if one financially strong company were to control and operate the whole of the coal properties in that county, namely, Mabou, Port Hood, Inverness and Ste. Rose, along with ownership and control of the Inverness Railway, which it is difficult to think of as a paying proposition unless it were used as a combined passenger and coal-freight road.

Acadia Coal Co.

Coal production for the first half of 1919 from this company's collieries is expected to reach 190,000 tons, which compares with 111,063 tons for the first half of 1918.

Dominion Coal Co.

A new shaft is being sunk between Dominion No. 1 Colliery and No. 2 Colliery. It is reported to be down 210 feet, and at 227 feet it is expected will strike the Harbour Seam. The Phalen Seam, to which the shaft will be eventually sunk is expected to be met at about 900 feet. The shaft is intended to be used for the lowering and raising of the workmen, It will also enable economies and improvements in the ventilation system.
and will shorten the walk to work very considerably.

It is also reported that the Dominion Coal Company is putting down test diamond drill holes with a view to re-opening the Gardiner (or Lorway) Seam at the Gardiner Mines, where it was formerly worked quite extensively by coal-cutters on the longwall system previous to 1893. The coal in this seam is known to be of good quality, particularly adapted for steam-raising and steamship bunkers. The area of this seam underlies and extends beyond the land-area of the Harbour and Phalen Seams, which have been worked above it, and it is therefore a virgin seam—or practically so—of greater area than any other of the seams worked by the Dominion Coal Company under the land area of the Glace Bay Basin. The seam is about 4 ft. 6 ins. in thickness.

Nova Scotia Steel Co.

Good results have been obtained in the Jubilee Colliery by the use of an electric locomotive underground operated by storage batteries.

FERNIE STRIKERS ASK FOR COMMISSION:

Fernie, June 20.

After nearly four week of strike in coal mines here and throughout District 18 of the United Mine Workers of America with apparently no outward attempt towards settlement, miners' headquarters have applied to Premier Oliver for appointment of a commission to investigate wages and working conditions within the mines, and have undertaken that upon this request being granted the strike will be declared off within twenty-four hours.

Similar representations have been made to the Dominion Government through Dr. Donnell, the local member, and an extract from a communication received from him yesterday read as follows: "Federal Government has no jurisdiction whatever over working conditions in the mines of the Crow's Nest Pass Coal Company. This jurisdiction is strictly in the hands of the Provincial Government at Victoria."

A telegram was received last night from Premier Oliver stating that the Provincial Government had the local situation in hand and that further information as to a proposed offer for settlement by the Ministers would be forthcoming shortly.

Special Correspondence

NORTHERN ONTARIO.

Porcupine V. N. T.

Arrangements have been made to resume work at the Porcupine V. N. T. just as soon as labor conditions appear to be satisfactory, an official of the company told the "Journal." Reports that work was to resume immediately, it was stated were premature in that there was no intention of starting up until the handicap of endeavoring to operate under the burden of industrial unrest gave reasonable evidence of being eliminated or at least minimized.

The property has been developed to a depth of 600 feet. At the 400-ft. level a large tonnage of commercial ore was opened up, while at the 600-ft. level a large body of ore was encountered but was not developed extensively prior to closing down.

Although the Porcupine V. N. T. has very little cash in its treasury yet of the $3,000,000 authorized capital, some $750,000 remains in the treasury in the form of unissued shares. This, in due course, will be available for construction purposes, and should suffice to install a new large mill, in addition to the present mill, with a daily capacity of about 100 tons.

Keeley Mine, South Lorrain.

Work is proceeding at the Keeley mine, in South Lorrain, the operators being apparently confident of gradually being able to enlarge the scope of work profitably.

Major J. McIntosh Bell, representing the present control, paid a visit to the property during the closing week of June.

Silver Discovery in N. Manitoba Not Confirmed.

The reported discovery of silver at mile 235 on the Hudson Bay Railroad north from The Pas, in Northern Manitoba, has been found to have been unreliable, the truth of the matter being that a calcite vein was discovered in which no mineralization appeared.

Kirkland Lake Gold Mines.

In an interview with Frank L. Culver, president of the company, it was learned that the physical condition of the Kirkland Lake Gold Mines is exceedingly strong. Although the mine is now closed down on account of the labor strike, yet the bins are full of ore, a dump containing 8,000 tons of ore is available for milling, stopes at the 300-ft. level are full of ore, and new stopes have been opened up in various other places along the 400-ft. and other levels.

Results recently met with at the 600-ft. level have been exceedingly satisfactory, Mr. Culver told the writers. The fact at the point where operations have been temporarily stopped, shows a width of 15 feet of ore containing average gold values of $55 to the ton. Parallelling this ore body in close proximity is another three feet of ore containing average values of $28 in the present face. At the 700-ft. level the heavy mineralization has been found to continue and some very rich ore has recently been opened up at that depth. This is not only the deepest working in the Kirkland Lake Gold Mines, but is the deepest point to which operations have been carried in the Kirkland Lake camp. With the resumption of work in due course it would be reasonable to look for a long period of prosperity for the mine.

In the construction of the macadam road from Swastika to the centre of activity in the Kirkland Lake district the labor strike resulted in a curtailment of work for a day or two, after which the men returned to work. The road is being built by the Ontario government.

Coleman District.

Financial arrangements are being made to resume work at the old Hylands property, situated in Southeast Coleman.

The old Mohawk property in Western Coleman, situated on the west side of Mud Lake has been reopened. The property is controlled by Petrolia interests, with whom was formerly associated the late William Gleason.

A good deal of work was done on the property in the early days of Cobalt, some smaltite and bloom being encountered, but without commercial silver values.

Elk Lake Growing in Importance.

Mining men recently returned from Elk Lake report more than usual activity in that district. The increasing activity in the Gowganda field, the amount of work being done in the Fort Matachewan gold area, and the large force of men engaged in the construction of a macadam road from Elk Lake to Gowganda all combine to make Elk Lake unusually busy.

Now that the government has actually begun the construction of the macadam road to the Gowganda field, Elk Lake appears to be reasonably assured of being the distributing point for the various mining districts, including the Maple Mountain, McKenzie Lake and Gowganda silver areas, as well as the Fort Matachewan gold area.

Purchase of Gold-Mine Shares Recommended.

That the present period of depression affords an excellent opportunity to purchase shares in some of the leading gold mining companies of Northern Ontario, is the opinion expressed by one of the most successful mining men in this district. One authority pointed out to the writer that for upwards of four years the economic conditions throughout the world had been working to the disadvantage of the gold mining industry, and had resulted in the depreciation of the quotations for shares in gold mining companies. War and gold mining, he said, never go hand in hand, whereas peace and gold mining do.

The signing of peace, and the probability of industrial unrest in this country being short lived seems to mark the turning point, and apart from the usual fluctuations the general trend in the quoted value of the gold mines is expected to record a more or less steady upward swing. Such is the expressed opinion of one individual, of course, but it is the voice of a man whose actions in the past appear to have been guided by wise judgment.

Dome Mines—Dividend Possibilities.

With the mill running at about half capacity, the Dome Mine is treating about 650 tons of ore daily and producing about $120,000 monthly, it is understood. This is an indication that mill heads are running in the neighborhood of $6 to the ton. For the time being a profit of about $2 per ton is indicated, or at the rate of about $40,000 a month, which is at the rate of not far under twelve per cent. annually on the company's issued capital.

When the mill is brought up to full capacity later

on in the year, the grade of the ore will probably be reduced to about $5 or $5.10 per ton. Also, accordingly as the tonnage is increased the cost of producing will decrease, and conservative mining men now look forward to a net profit of $2 per ton on all ore treated, and which would indicate $2,700 net profit daily, or at the rate of $985,500 annually, with the mill running at full capacity of 1,350 tons daily.

This would make it possible to resume dividend disbursements at the rate of twenty per cent. annually, and leave about $185,500 to be carried to sulplus each year. It appears to be the consensus that when President Bache stated that dividends would be resumed in January next, the declaration was based on sound calculations.

New Gold Find Reported in Fort Matachewan Area.

Another promising discovery of gold is reported to have been made on a claim situated in the neighborhood of the Big Bend waterfall in the Fort Matachewan gold area. According to reliable information, samples taken from the surface of a large dyke containing heavy iron sulphides show substantial gold values.

Tough-Oakes Merger.

The merging of the Tough-Oakes with the Burnside and the Aladdin-Cobalt companies is now considered accomplished, but for the time being the syndicate is not included in the merger, a hitch having occurred in negotiations.

Mining interests in Buffalo have been quietly accumulating shares in the Sylvanite company, and two factions appear to be making a bid for control. The English interests favor the consummation of the merger along the lines originally proposed while the Buffalo interests appear to favor a change in terms. The situation is one that might be straightened out satisfactorily at more or less short notice, yet at the same time it might reasonably result in prolonged negotiations.

Kerr Lake May Production.

During the month of May the Kerr Lake mine produced 105,582 ounces of silver, as compared with 104,477 ounces during the preceding month. The May output was the highest for any one month since January.

Despite the fact that production has decreased about fifty per cent. as compared with a year ago, the Kerr Lake is still yielding close to one and a quarter million ounces annually. For the first five months of the current year the output amounted to 528,318 ounces as compared with 1,085,793 ounces for the corresponding period of 1918. The quotations for silver have averaged about 10 cents per ounce above the last year period and has to some extent made up for the decline in production.

Silver-Ore Find at Skead Misleading.

The discovery of high grade silver ore on an old dump near the east boundary of the township of Skead has been found to be misleading, after careful investigation has been made. It is evident from the nature of the vein on which a test pit had been sunk that the high grade silver ore lying on the dump did not come from the vein. It is accordingly concluded it must have been carried there many years ago for "salting" purposes.

Promising Gold Find Reported on Line of Algoma Central.

A promising discovery of gold is reported to have been on a claim along the Algoma Central Railway, by Thos. Powell of Haileybury, and G. Craig of Cobalt. The find is stated to have been made near mile 61 of the A. C. R.

Kirkland Lake Properties Likely to Remain Closed Until Autumn by Wages Dispute.

The mines in the Kirkland Lake mining area, kept in operations by shareholders during the war on the expectation that the cessation of fighting would bring almost immediate prosperity to the gold mines, have closed down indefinitely. The reason for the curtailment is the fact that some 500 men, drawing a monthly pay-roll of approximately $75,000, or at the rate of $900,000 a year, have gone out on strike, following the refusal of the companies to accede to the demands of the Miners Union.

For the two years, 1917 and 1918, the mines of Kirkland Lake were able to pay only a total of $100,000 in dividends. This was paid by one concern, the Lake Shore. At the numerous other mines a stream of money was being paid out to the mine workers, each year representing a large aggregate loss to the shareholders of the various companies. The present situation is, therefore, but the inevitable climax. The mines are closed, and with them goes the source of nearly a million dollar annual pay-roll to the mine workers of Northern Ontario.

Thanks to the boundless confidence of those in control of the mines of Kirkland Lake, the camp grew more rapidly during the past two years than did any other mining camp in the Dominion. The results achieved were little short of marvellous, and there can be no question but that the shareholders will in due course reap the reward of their enterprise and optimism.

It would perhaps be folly to attempt to estimate the duration of the strike. However, after accepting the opinion of certain of the mining men that curtailment may continue until Fall, there are numerous factors that should offer encouragement to shareholders. First, is the fact that costs are abnormally high and profits reduced to a minimum under the existing conditions, whereas Fall may reasonably be expected to bring a considerable reduction in costs and a corresponding increase in profits. In the meantime, also, the construction of a macadam road from Swastika to the centre of activity should then be completed, thus reducing the cost of transportation. In one sense of the word, the shareholders will have saved money through the mines being closed, the only drawback being the more or less short delay.

For instance, provided a mine were able to produce $50,000 a month at a cost of say $45,000 a month under present conditions, as compared with a production of $50,000 at a cost of $30,000 a month a few months hence, it would indeed appear to be good business from the shareholders' points of view were the latter course to be followed. At the recent formal opening of the Haileybury Mining School, the Minister of Education for Ontario, Hon. H. J. Cody, made the remark that a large percentage of the mine managers of this country were educated in schools far removed from the mining centres, and that a great many came from abroad.

The statement was correct in every particular. At the present time the majority of the mine managers of this part of Northern Ontario are citizens of the United States. These men have had the advantages of technical education in their native land, and, in coming to Canada have become an asset to this country. The Dominion as a whole should be proud of having possessed the merit to induce such a body of men to devote their lives to the development of the great mineral resources of the Dominion. At the same time Canada should be more self-sustaining in the management of her mines, and every opportunity should be seized to further technical education in this country.

BRITISH COLUMBIA.

Moose Property is Bonded by O. B. Bush.

The Moose property in the Alice Arm district has been bonded by O. B. Bush, of Stewart, from Don Cameron, for $150,000. Work will probably start about July 15th. The Moose group adjoins the Climax up the hill, and is comprised of six claims. The vein is of pyritized quartz, occurring in what is locally termed the "silver belt." Some of the ore, which has been exposed by open cutting in several places, is very high-grade, and can be shipped when the railroad is completed.

Slocan District.

The Gold Cure Mining Company, seven claims, South Fork, Kaslo Creek, Slocan. Will resume 1st July. Company incorporated 1917, and good camp erected. Several veins from which high grade ore shipped in early days. Gold Cure adjoins the Gibson on N. and S. Gibson has been under development for the past two years. Operations are proceeding on Index, which is in the same neighborhood. Silver Bell, from which a car of ore netting $7,000, recently shipped. Cork Province also active. Motor trucks will be used to haul ore from above properties to Trail, a distance of eight miles.

BUY YOUR COAL NOW.

A survey of the coal situation by the Commission of Conservation proves that a coal shortage next winter, and possibly next autumn, is almost a certainty.

During the week ended May 24th, the output of anthracite was only 1,679,000 tons. This production is 65,000 tons LESS than the week preceding, and is 326,000 tons less than the corresponding week in 1918. While the production is falling off, retail dealers in the United States continue to be deluged with orders from customers who are insistent upon prompt deliveries.

The shortage is due to a number of causes, not the least of which is the migration of tens of thousands of Jugo-Slavs, Czecho-Slavs, Hungarians, Poles and other Europeans who are returning to Europe.

In addition, if there is such a serious shortage, we may confidently expect much higher prices for anthracite. Therefore, the Commission of Conservation advises consumers to purchase their winter supply of hard coal at the earliest possible date.

Precious Metal Mining in Northern Ontario

Gold Production Will Shortly Exceed Silver Output.

By J. A. McRAE.

The first half of the current year draws to a close a period of re-adjustment at the gold mines of this country, and marks a slight increase in output as compared with the last six months of 1918. The added financial burden imposed by the war, involving every kind of material used in connection with mining, including labor, has proved something that will not disappear with the declaration of peace. Just as the economic strain increased during the whole of 1917 and a large part of 1918, so will it require the whole of 1919 and a part of 1920 to relax. A least such is the calculation of some of those who have given the matter a good deal of thought, taking into consideration the trend of prices of material and the status of labor.

The output of gold from northern Ontario during the first six months of 1919 may be estimated at approximately $4,000,000. A labor strike at Kirkland Lake, calling the mine workers from their work about the middle of June, has served to eliminate the Kirkland Lake camp from the producing list for the time being. This is expected to be only temporary, and within a reasonably short time the industry in that rapidly growing camp may be expected to again assume large proportions. Meantime, in the Porcupine field the Hollinger Consolidated has recently succeeded in increasing its output, as also has the McIntyre-Porcupine. Also, the Dome Mines has resumed production, the output at the time of writing being at the rate of about $100,000 every thirty days. The present indications are that the last half of 1919 will see the gold output reach upwards of $5,000,000, and this added to the $4,000,000 produced during the six months just ended, will probably exceed any previous year in Ontario's history, with the possible exception of 1916, when $9,397,588 was produced.

At the rate the economic situation is re-adjusting itself to the advantage of the gold mines, the beginning of 1920 will probably see the gold mines producing at the rate of $1,000,000 every thirty days. Indeed, taking into full consideration the large number of mines which are equipped with first class reduction plants and with substantial ore reserves to draw from, it would not be surprising were production to reach $1,250,000 monthly during the year 1920. It is evident, therefore, that the silver mining areas and the gold mining areas of Northern Ontario will be healthy rivals for the distinguished position of being the leading precious-metal producing districts of the Dominion. At the moment, after taking into consideration all the visible evidence, it would be next to impossible to intelligently venture an opinion as to which industry, gold or silver, will head the list in 1920. One thing seems certain, however, and that is that unless new silver-producing mines or areas are opened up within the next year or so, the silver-mining industry will take second place to gold-mining. The reason for this is the great extent of the area in which gold is being discovered, and the enormous gold in proven ore at the mines, amounting to about four times the amount of silver ore in sight.

During the first half of 1919 there were only three important gold producers, namely: the Hollinger, McIntyre, and Lake Shore. Small producers includ-

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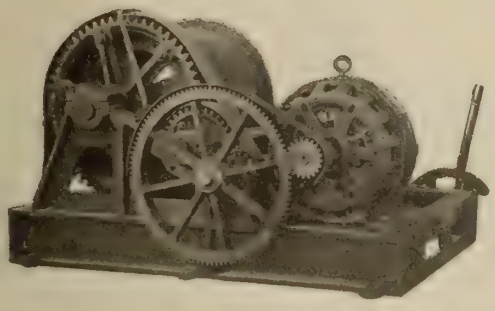

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ed the Teck-Hughes, Dome Lake and the Davidson. Recently, however, the Teck-Hughes has increased its rate of output, the Dome Mines is producing once more, and the new mill of the Kirkland Lake Gold Mines was started up.

From present indications, based on the assumption that the labor strike at Kirkland Lake will soon run its course, there may be about thirteen gold mines producing bullion by the end of the current year.

The following is the position of the mines in the Porcupine field, showing the capactiy of each plant and the extent to which the equipment is being utilized:

Mine.	Daily Capacity in tons.	Present Rate.
Hollinger Consolidated ...	2,800	Three-quarters.
Dome Mines	1,350	Half.
McIntyre-Porcupine	600	Full.
Schumacher #	200	Closed.
Porcupine Crown #	140	Closed.
Porcupine V. N. T. #	120	Closed.
Dome Lake	100	Three-quarters.
Davidson	35	Full.
Newray	30	Closed.

Note.—Those marked thus #, likely to re-open during the last half of this year.

The following mines in the Kirkland Lake and the Boston Creek districts, although handicapped now by the labor strike, may be expected to be producing at full capacity before the end of the current year:—

Mine.	Daily Capacity in tons.
Kirkland Lake	150
Tough-Oakes	140
Teck-Hughes	100
Lake Shore	70
Miller Independence	40

Among the properties where small milling plants are still in idleness with not much probability of reopening for some few months, might be mentioned the following: Newray, Burnside, Patricio, Croesus, Hill Gold Mines, Huronia and Associated Goldfields.

In summarizing the situation, it appears quite reasonable to expect to see thirteen out of a total of twenty mills at the gold mines of Northern Ontario in full operation by the end of 1919. This compares with only five in operation at the beginning of the year.

The unsatisfactory labor supply and the abnormal cost of material has been solely responsible for the majority of the mills being idle. Both of these factors show marked improvement as reflected in the greater number of mills now in operation and the general preparations to resume production at every one of the important mines.

BRITISH COLUMBIA MINE RESCUE STATIONS INSTALL U. S. BUREAU OF MINES TYPE OF BREATHING APPARATUS.

The Minister of Mines of British Columbia has received an enquiry from the State of Virginia as to the performance of the "Gibbs" type of breathing apparatus. In reply Mr. Sloan stated that six sets of the Gibbs apparatus have been added to the equipment of the Government mine rescue station at Fernie and six more have been ordered for the Nanaimo station. The Minister points out that tests of the apparatus have been conducted at Nanaimo which have proved that it is much superior to the older types of apparatus.

IN THE MATTER OF

The German Development Company, Limited

SEALED TENDERS will be received addressed to **G. T. Clarkson, 15 Wellington Street West, Toronto,** and marked "Tenders re German Development Company, Limited," up to Twelve o'clock noon of **Wednesday, July 16th, 1919,** for the purchase of the following assets of the German Development Company, Limited, namely:

Parcel No. 1.—68,000 shares, of a par value of $1.00 each, of the Capital Stock of the Miller Lake and Everett Mines, Limited, the owner of certain mining claims in the Miller Lake District in Northern Ontario.

Parcel No. 2.—Mining Claim being the S.E. ¼ of the N. ½ of Lot 9 in the 5th Concession in the Township of James, Timagami Forest Reserve, containing 39-⅝ acres, more or less, covered by Mining Lease No. 3818, from the Province of Ontario.

Parcel No. 3.—Mining Claims T. C. 453, 454, 455, 456, and 457, and M.E. 723, 522 and 523, and G.G. in the Township of Halton, District of Nipissing, containing 157 2-5 acres, more or less, covered by Mining Lease No. 3875, from the Province of Ontario.

Parcel No. 4.—Mining Claim being the N.E. ¼ of the N. ½ of Lot 12, in the 4th Concession in the Township of James, District of Nipissing, containing 4¾ acres, more or less, covered by Mining Lease No. 3878, from the Province of Ontario.

Tenders for Parcel No. 1 must be at a rate per share for the shares offered, and the tenderers must agree to purchase any lesser number of shares than 68,000, but not less than 25,000, if the undersigned shall so require.

As to Parcels Nos. 2, 3 and 4, the purchasers shall search the title at their own expense, and purchasers shall have ten days in which to make any objection or requisition as to title. In case any purchaser shall within such time make any objection or requisition which the undersigned shall be unable or unwilling to remove or answer the undersigned shall be at liberty to rescind the sale, in which case the purchaser shall be entitled only to a return of the deposit money without interest, costs or compensation.

Terms of Sale:—25 per cent cash and the balance within thirty days.

Each purchaser at the time of sale must sign an agreement for the completion of the purchase.

Tenders will be opened at the office of the undersigned, 15 Wellington Street, West, Toronto, at Twelve o'clock noon of Thursday, July 17th, 1919, when all tenderers are requested to be present.

Tenders must be accompanied by a marked cheque payable to the undersigned for 10% of the amount of the tender, which will be returned if the tender be not accepted. The highest or any tender not necessarily accepted.

For further particulars and conditions of sale application may be made to the undersigned.

Dated at Toronto this 9th day of June, 1919.

G. T. CLARKSON,
Controller and Manager of
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EDITORIAL

TRANSPORTATION FOR THE NEW GOLD AREA.

Relative to the problem of carrying supplies to the West Shining Tree district, which includes the Wasapika gold area described in this number of the Journal, the Toronto World says editorially:

"The World has urged upon the government the necessity of putting more energy into the work of furnishing transportation facilities to the mining interests of the Shining Tree district.

"So long as the government lags on the performance of a manifest obligation it limits and restricts the advantages and benefits which the new gold district is destined to confer upon the entire community. Central among these advantages and benefits at the present moment would be a broad progressive effect upon our industry in minerals and metals, the potentiality of which the financial world is beginning to realize.

"Government is often asked these days to undertake expenditure in different directions where return is both uncertain and substantial. The revenue that comes from the mining industry reaches the public account before the investor gets his dividend, and sometimes before the speculator pockets his profit. Government alienates property in minerals not only because it is absolutely certain of revenue from private ownership, but because the state by obvious indirect sources of gain increasingly supplements taxation of the country's producing mines.

"So long as the certainty of production lies ahead in respect to minerals and metals the first incentive to the attainment of that stage should be felt by the government. But, as the "World" has shown, the West Shining Tree camp has reached that important point of progress along the road to productive success where it must wait for the government to come along with transportation facilities. The government has fallen behind even with temporary facilities.

"Credit must be given where it is due. A good deal of accurate, painstaking and timely work was done in regard to the mineral survey of the district. All this led up, as it was intended, to the opportunity where the government could make a safe investment in the supply of a public service to private investors who had found the government's information about the mineral resources reliable and helpful.

"It would be economy now to hasten not only the temporary transportation facilities, but to make an immediate beginning of the permanent communication by rail. Every month that this work may be delayed will mean pecuniary loss to the government itself and to the general commercial community.

"Judging by the active conditions of the new camp it would appear to be the most questionable economy to rest satisfied for a day with the completion of the wagon road that has so long been demanded."

What is immediately needed for the Wasapika area is an improved wagon road. The Ontario Government is endeavoring to make the present road useful to those who are taking in machinery to develop the gold deposits. No endeavor is yet being made to build a road suitable for motor trucks.

Fortunately the road from Westree to Wasapika crosses fairly level country, and does not encounter many serious obstacles. A bridge has already been constructed across the river at the Halfway. Timber for corduroy stands beside the roadway nearly everywhere. Gravel beds are numerous. The men and teams now at work will be able to greatly improve the road this summer. We would like, however, to see three or four times as many men and horses at work. Next year the area may have sufficiently advanced to warrant the Government converting the wagon road into a first class motor road.

So far as railway construction is concerned it seems to us advisable to consider whether a light railway such as was used in France would not answer the purpose. Returned soldiers who have made the trip to Wasapika have naturally given expression to the view that a light railway would be just the thing, and that it could be constructed economically. A good motor road would answer the purpose, but if the road is not made suitable for motor traffic a railway of some kind will be necessary. Why not a light railway?

MINING PROFITS AND WAGES.

In a statement given out at Cobalt by an official of the Miners' Union we find the following paragraph:

> "We want to be a constructive organization. We are miners and do not want to ruin the mining business from which we get our livelihood. We feel, however, that we are entitled to a wage commensurate with the work in which we are engaged. Our future lies in the mining industry as much as there is no doubt that many misunderstandings like those existing in Cobalt today would be wiped out."

This looks to us like an invitation to the managers that should be immediately accepted. As intimated

previously in these columns, our opinion is that the past history of the unions should not be allowed to stand in the way of a proper understanding now. It is well to know something of that history; but it is folly to allow it to obscure the present situation. The miners should have full opportunity for expressing their views.

They should also be made to realize that they cannot expect to take all the profits of the industry; that it is essential to the life of the industry that some operators should be very successful; that no new properties would be developed unless someone attracted by the chance of winning a prize risks his money in exploration. If he is successful there are many new jobs for miners, and if he fails the miner is not asked to pay the cost. Neither the miner nor the mining companies can be depended on to furnish capital for the development of new areas. Some do their share and some do not. Much of the money for the development of new areas must come from other sources, from those who are willing to venture in the hope of making big profits. Many a man who will taks chances himself will not ask shareholders of companies in which he is interested to take the same chances. Some who have been exceptionally lucky once are content for the future to leave the making of mines to others, recognizing that lightning rarely strikes twice in the same place. No new discovery is developed without risk to those who supply the money, and development depends largely on the faith of the venturesome in the richness of our natural resources and in their knowledge that the profits are in some instances very large.

Under the circumstances, we cannot agree with the same union official when he implies that those investing money expect to shift the burden on their workmen if a good prospect fails to make a paying mine. That is exactly contrary to the facts. There is no certainty of profit for those who furnish the money: but the workman profits whether the venture pays or not. It is true that in some cases where the price of metal has been exceptionally high the workman has received higher than normal wages, but it is also true that the workmen receive a very large proportion of the expenditures of mine operators in the case of losing ventures as well as in the successful. If there is anything certain about mining in Ontario it is that workmen will receive their wages and that they will not be asked to make good the losses of the operators. The Union official is not justified in stating that "those investing money with the hope of big returns cannot expect to shift the burden on their workmen if a good prospect fails to make a paying mine." He implies that the operators of unsuccessful ventures endeavor to shift the burden on the workmen. We do not believe this to be true.

MINERS' CERTIFICATE BOARDS—CHANGES IN BRITISH COLUMBIA.

As will be noted from our British Columbia communication, the Legislateur of that Province, on the initiative of the Minister of Mines, has amended the C. M. R. Act insofar as it relates to the method of granting certificates of competency to miners and officials by abolishing the local examining board at each colliery and substituting a travelling board. A similar reform was made in the Nova Scotia C. M. R. Act a few years ago, and in place of the persons who were formerly appointed for the purpose of granting miners' certificates at each colliery, Local Boards were appointed by the Commissioner of Mines. British Columbia has adopted a plan which is suitable for a Province of wide distances and varied mining activities. In both British Columbia and in Nova Scotia, we believe, the reform was needed to cure certain abuses in the granting of miners' certficates, which are well understood locally, but not usually discussed.

We are slightly puzzled at the statement made by our correspondent, which indicates that the employ ment of aliens in British Columbia mines is not desired, and is, in effect prohibited, by the new regulation. Alien is a term of wide application, and even the more specific appellation of "enemy alien" is difficult to apply now that Europe is being re-cast, and the former citizen of Austria-Hungry has blossomed out as one of a dozen resurrected ethnological persistences. Unless emigration to Canada has ceased—which no one believes—we expect the Dominion in the future to be enriched by the labour and national genius of many European nations, as it has been in the past. While we earnestly believe that the greatest discrimination should be exercised over incoming emigrants to Canada, and feel that public opinion agrees that our national gates have been too wide open in the past; and while also the danger to British institutions from the careless admission of undesirable European emigrants has been of late only too clearly demonstrated in Winnipeg and elsewhere, we also feel that any attempt to ear-mark for British citizens exclusvely any particular branch of endeavour in Canada will not only impose tremendous economic limitations, such as may cause public opinion to swing too quickly the other way, but will be out of harmony with Canadian policy, which in the past has welcomed good men, from any country, as potential Canadians. If the League of Nations becomes an international reality, what will constitute an "alien"?

EDITORIAL NOTE.

The concluding portion of the Oil Concession Correspondence, the last instalment of which appeared in the "Journal" of the 2nd July, is held over until the issue of the 16th July.

THE FALLACY OF THE ASSUMED ADVANTAGE OF RESTRICTING OUTPUT.

"The proposition that the prosperity of the country depends upon production in the country obtains no credence whatsoever, being generally treated by working men as a sheer irrelevance."

This most dangerous and widespread fallacy is discussed, amongst other current fallacies, by Sir Lynden Macassey in the Edinboro' Review, who says further:

"The delusions referred to cannot justly be described as 'heresy contumaciously adhered to.' They are in most cases honest misconceptions, and no solution of the labour problem is possible until all this error and mistaken belief has been swept away."

One fallacy dissected by Sir Lynden Macassey is that government intervention can override economic law, and this particular misconception is not confined to Great Britain.

A newspaper report from Sydney, Nova Scotia, states that the United Mine Workers' Executive has decided to inaugurate a five-days' working week, commencing 2nd August.

In the same announcement it is stated that plans are being made for a joint meeting of the steelworkers of the Dominion Iron & Steel Company, of the Nova Scotia Steel Company, and of the mineworkers of both companies to discuss the advisability "of asking the Government to keep these plants running."

From previous references to the five-day week proposal we gather that it is being urged because of the "assumed advantage of restricting output," and is not based on the necessity for shorter hours of work, and one must assume that the miners' leaders are sincere in their mistaken belief that enforced restriction in production will assist in the restoration of business prosperity.

The coal production of Nova Scotia during 1919 will not, we believe, reach five million tons. Year by year it has dropped from the maximum of 1913 until it is now 2½ million tons per year below the 1913 rate of production. It is necessary to go back twenty years to find as low a coal output in Nova Scotia as will be recorded in 1919. The loss in provincial royalty revenues alone is $300,000 per year, and that deficit must be made up out of taxation of the people of Nova Scotia. Canada's adverse trade balance is piling up, her credit on New York must be paid for by a higher premium than previously recorded. The Montreal market is temporarily at least lost to Nova Scotian coal producers.

It really does not matter much, this summer, whether the United Mine Workers decide to work five days per week, or any other number of days, because the choice of work will not lie with them. It will depend on the market for their labour. No juggling with hours of labour, with wages, or with profits, will permanently enable the people of any nation to enjoy or consume a greater value than that of their production.

Meantime, we commend to the earnest thought of the mine-workers of Nova Scotia one outstanding economic fact, namely, that in spite of all the capital invested in developing collieries, shipping fleets, discharging plants and markets, the coal production of Nova Scotia is back where it was twenty years ago.

THE NELSON INTERNATIONAL MINING CONVENTION.

In this issue of the "Journal" will be found a full account, by our British Columbia correspondent, of the Second International Mining Convention held in Nelson during the 19th to 20th June. An interesting feature of the Convention—and one which assured its success—is the number of organizations which combined to arrange for the meeting. These included the Nelson-Slocan and British Columbia Mining Men's Club, the Northwest Mining Association of Spokane, the Kootenay Mine Owners' Association, the Spokane Chamber of Commerce, the Vancouver Chamber of Mines, the City of Nelson and the associated Boards of Trade of Eastern British Columbia and Nelson.

The techncial programme was in charge of the Columbia Section of the American Institute of Mining & Metallurgical Engineers, and the Western Branch and Kootenay-Boundary Branch of the Canadian Mining Institute.

A mere statement of these facts, without comment, is sufficient indication of the organized comradeship that characterises the mining men of the Pacific North-West, not the least pleasing part of which is the international good-will that makes such a gathering possible, and rendered it so thoroughly successful.

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5 DAYS WORK A WEEK.

Sydney Miners Will Inaugurate New Schedule Aug. 2.

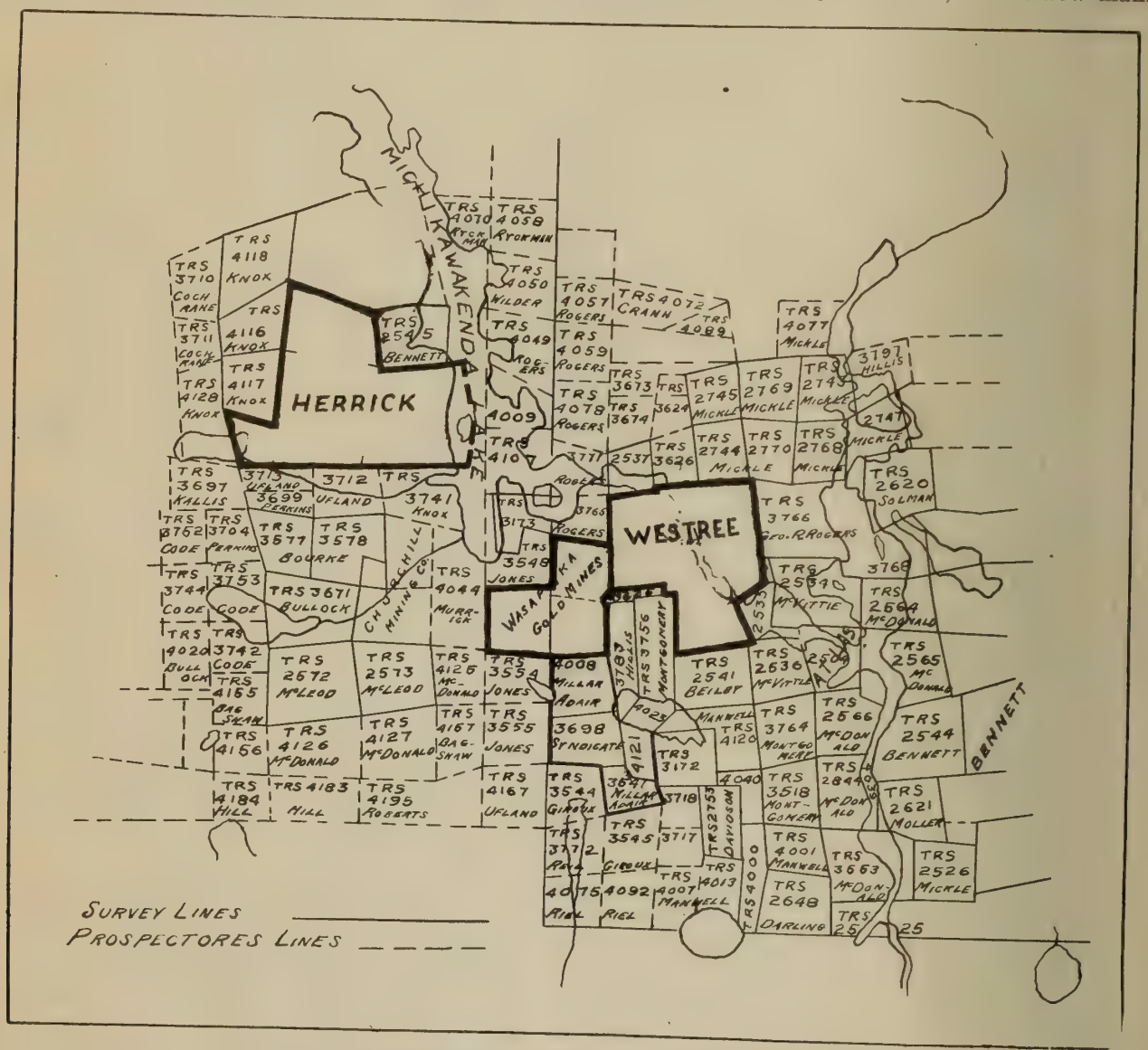
Sydney, N.S., July 7.—That the proposed five day working week will be inaugurated, beginning August 2nd, was the decision arrived at by the United Mine Workers' executive, in session at Glace Bay. Another decision of considerable public interest was the voting of the sum of $500 to assist the arrested Winnipeg labor leaders with the cost of their defence.

Plans are being made for a joint meeting of the steel workers of the Dominion Iron and Steel Company, and of the N. S. Steel and Coal Company, and the miners of the companies to discuss the advisability of asking the Government to keep these plants running. Things have come to the point where immediate action is necessary, and work is becoming slacker every day. At Sydney Mines the miners are working only two days of the week.

The Wasapika Gold Area

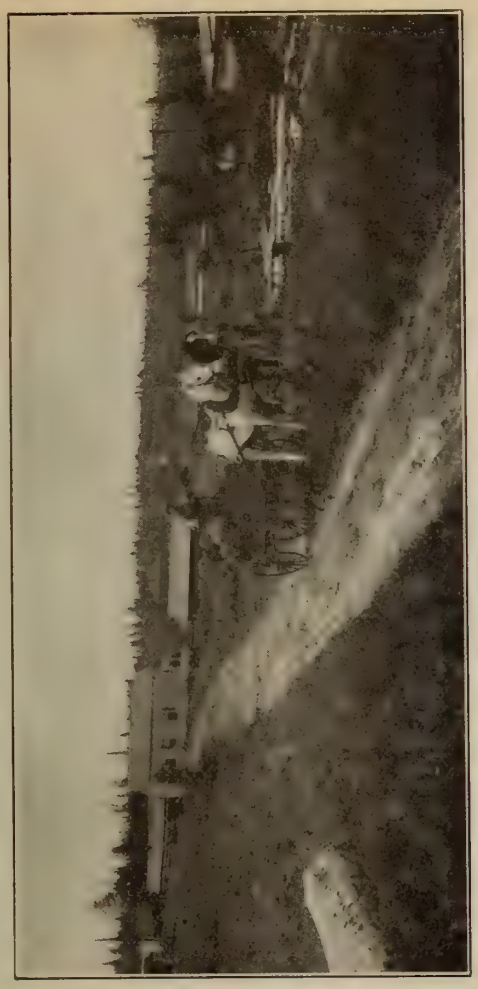
By REGINALD E. HORE.

In July, 1918, in company with Mr. George R. Rogers, president and manager of Wasapika Gold Mines, Limited, I visited the Wasapika and neighboring properties in Churchill and MacMurchy townships, Sudbury mining division, Ontario. Some account of the area was published in this Journal last August. I have recently revisited the area, and have again been very favorably impressed with its possibilities. Under the direction of Mr. Rogers, development work is being carried on at several properties in a way that is commendable, and is very likely to result in the making of gold mines in this little known, but much discredited area.



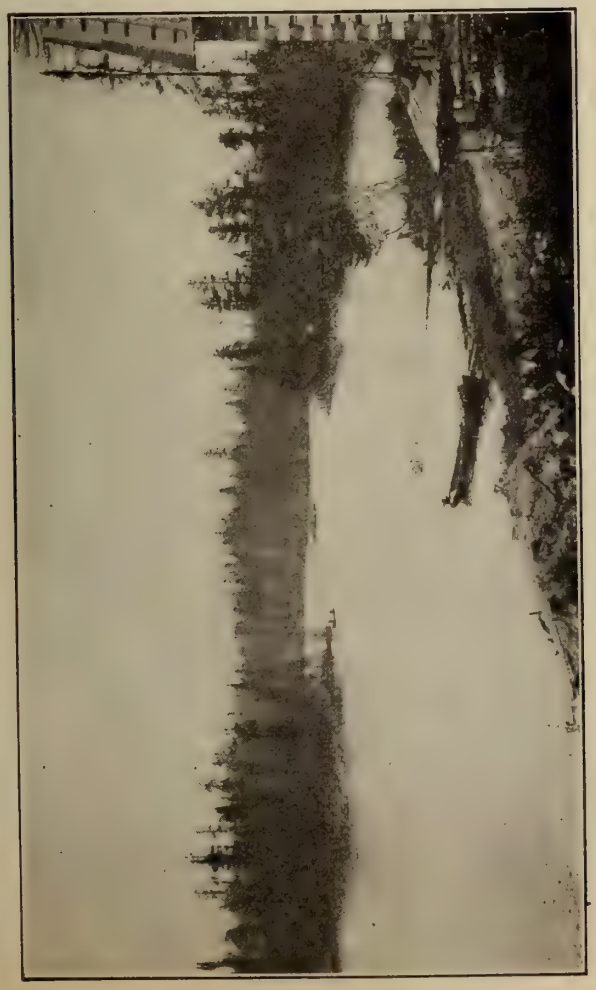
Sketch Map of Wasapika District.

In this article, I will give some account of my observations. The numerous photographs will help readers to visualize the area. Those who are particularly interested in the development of new fields will be able to appreciate what Mr. Rogers and his associates have accomplished. When he entered the area a few years ago many discoveries had been made, and hundreds of claims staked, but very little development work was being done. He carefully examined a large number of properties and purchased a few of them. On one of the most promising he did considerable surface work. After carefully sampling, he decided to develop the Ribble vein on what is now known as the Wasapika property. Like other pioneers who would develop mines in a new district he encountered many obstacles, notably transportation difficulties, but he stayed with it, and is now making mine at the Wasapika. He is also in charge of the development work on other neighboring properties, and is handling them in an able manner. No man can be certain as to the outcome of mining ventures; but the Wasapika area has promising ore deposits, and will in all probability become a profitable producing area if the properties are all handled in as capable a manner as those in which Mr. Rogers is interested. The making of a producing mine in the hinterland is something that arouses our admiration, and I need

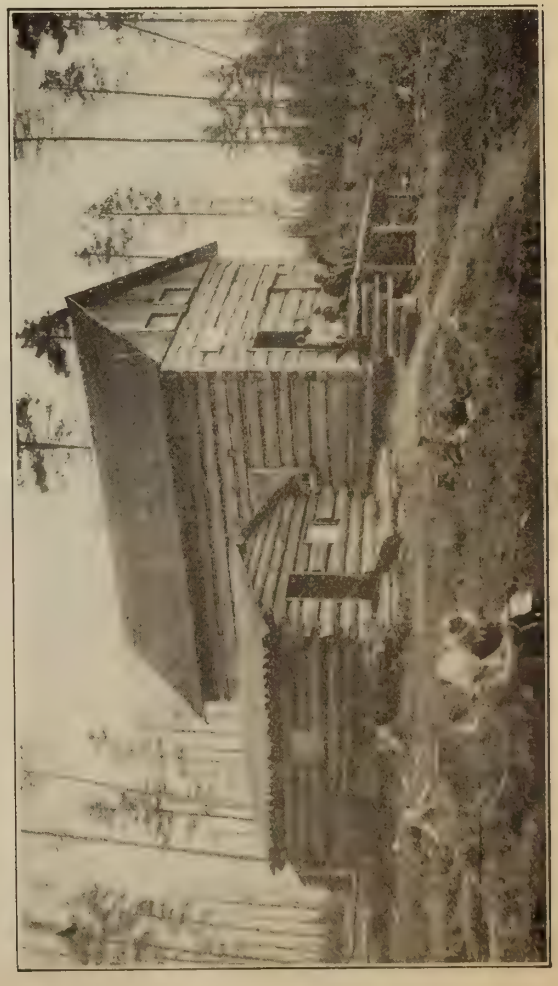


Westree, on the Canadian National Ry. The starting point on the road to Wasapika.

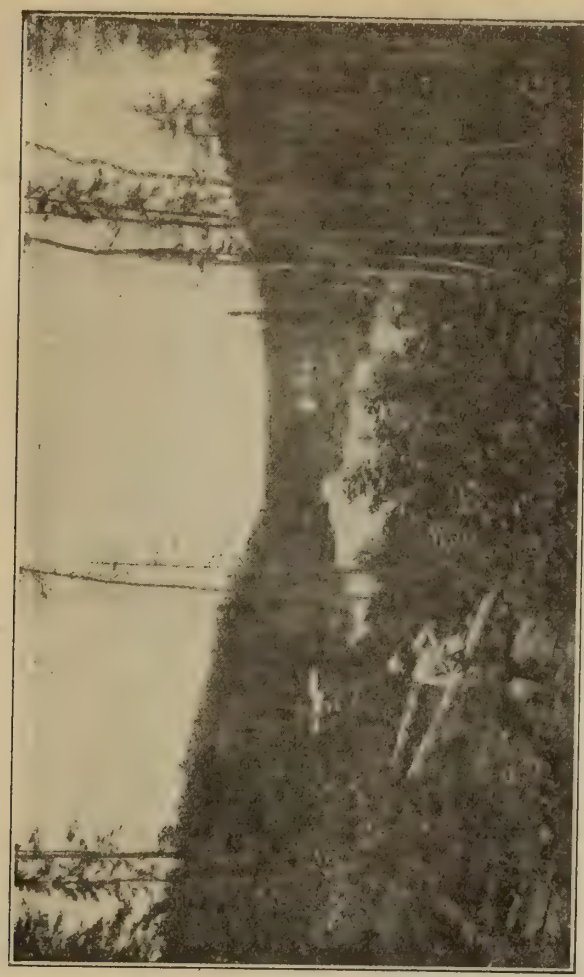
On the road to Wasapika.



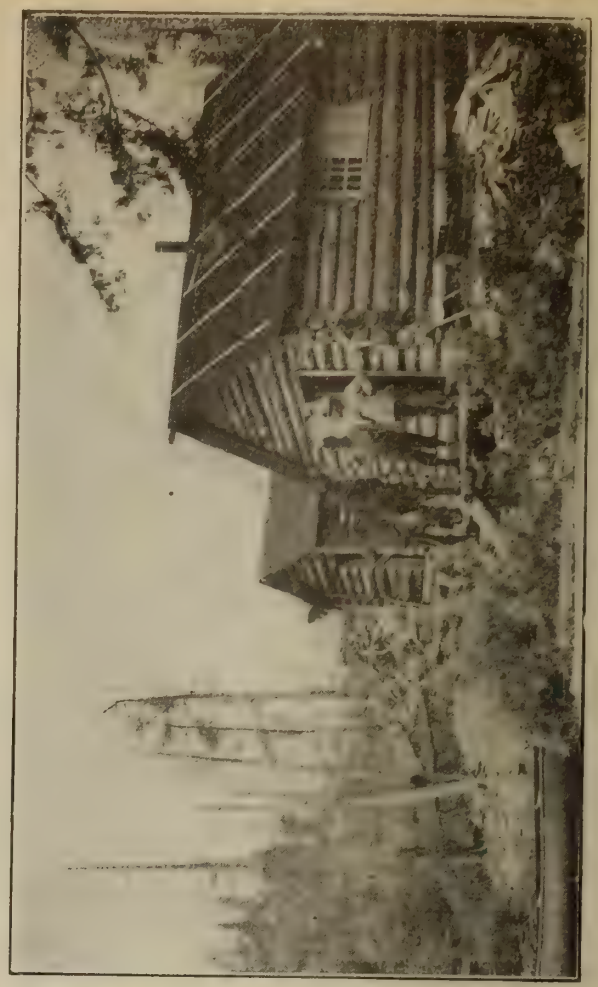
A View from West Shining Tree Hotel.



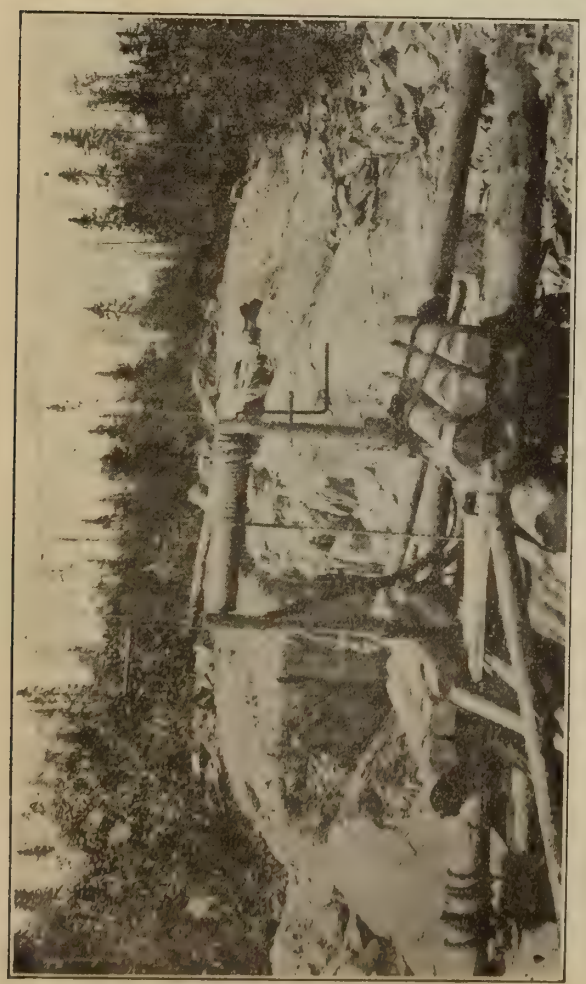
West Shining Tree Hotel.



Looking up Upper Wasapika Lake. Westree Camp buildings at left.

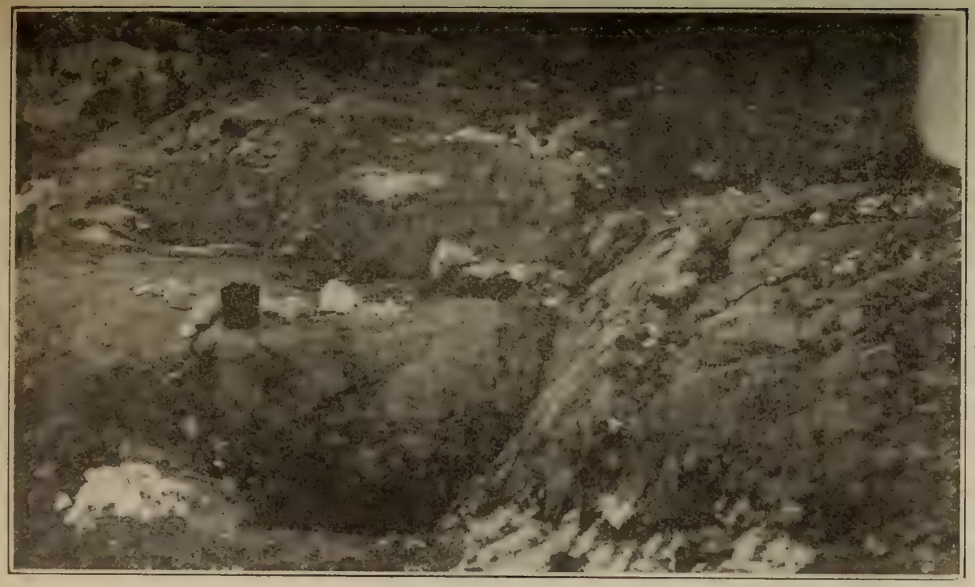


The Westree Office.

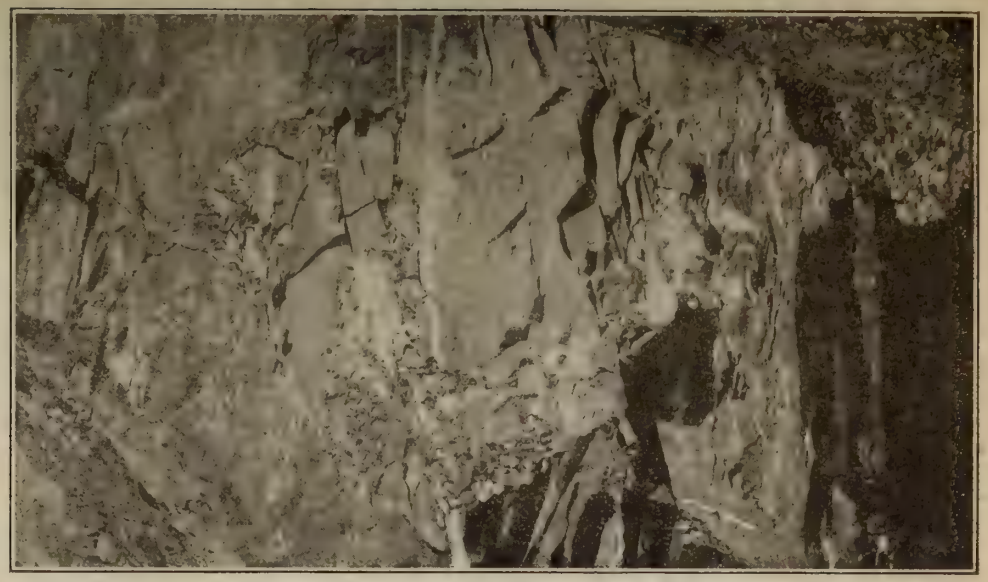


Westree Shaft No. 2.

Looking up Upper Wasapika Lake from edge of dump at Shaft No. 1.



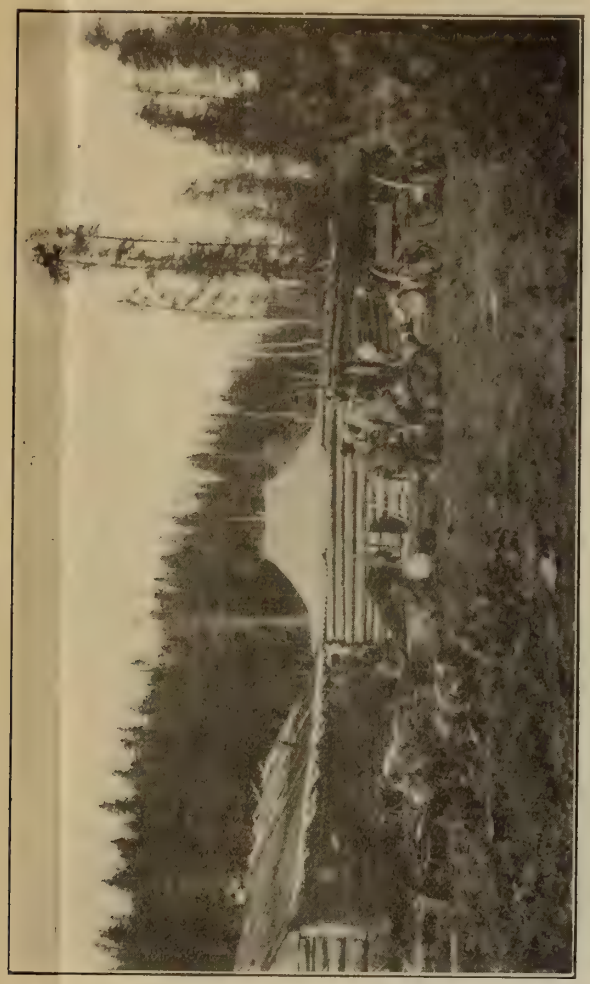
Looking along a fault in the Bennet Vein.
Vein shows at centre and continuation at lower edge of photo.



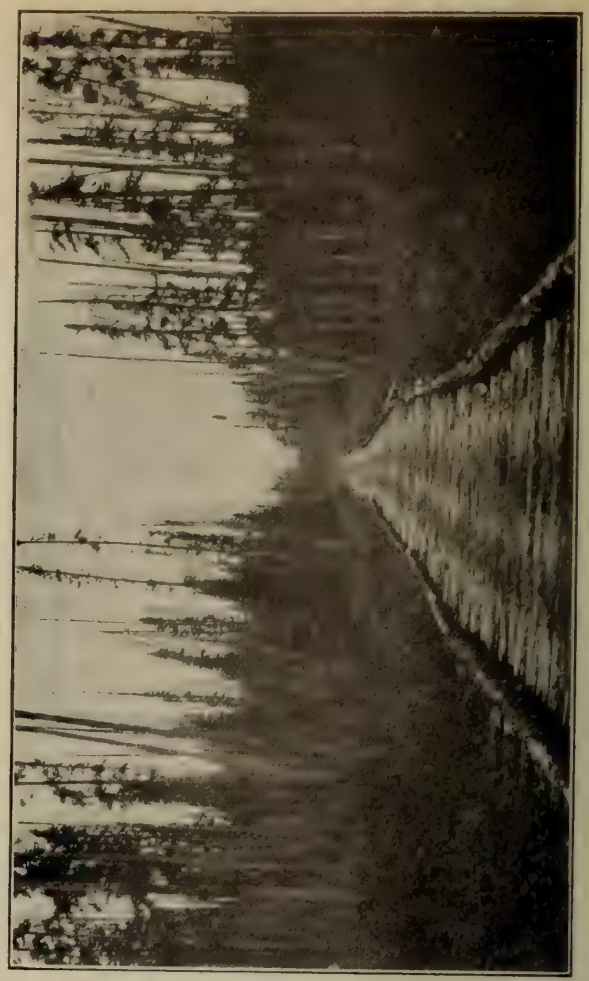
View of the Westree ore Deposit at Shaft No. 2.

An Outcrop of the Ribble Vein, Wasapika Mine.

An outcrop on the Westree Property.

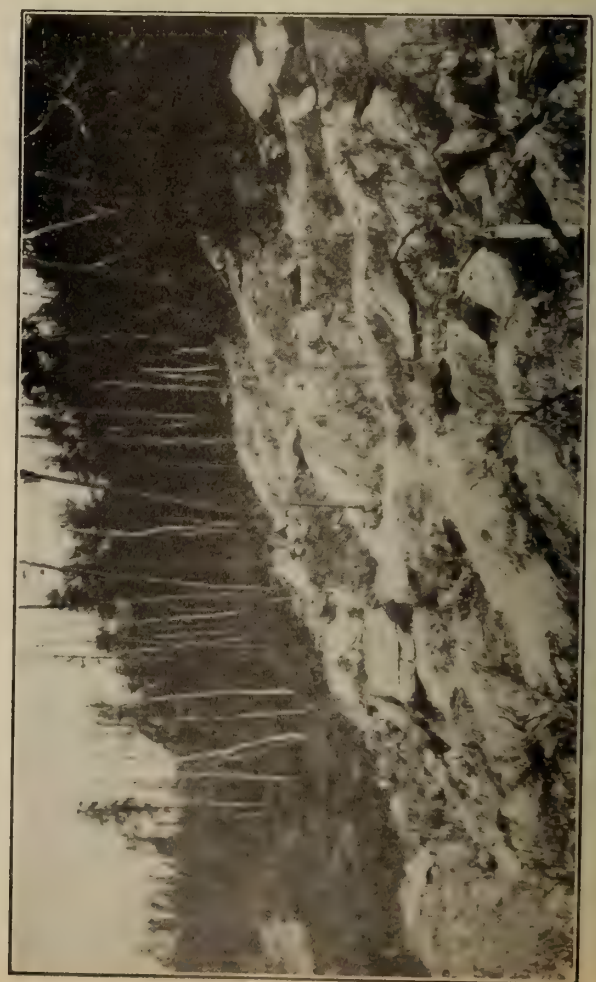


Halfway House on the Road to Wasapika.



A stretch of Corduroy west of Halfway on the road to Wasapika.

The Outlet of Upper Wasapika Lake.



An Outcrop on the Wasapika Property.

The Wasapika shaft on the left. Ribble vein outcrops at right and in District.

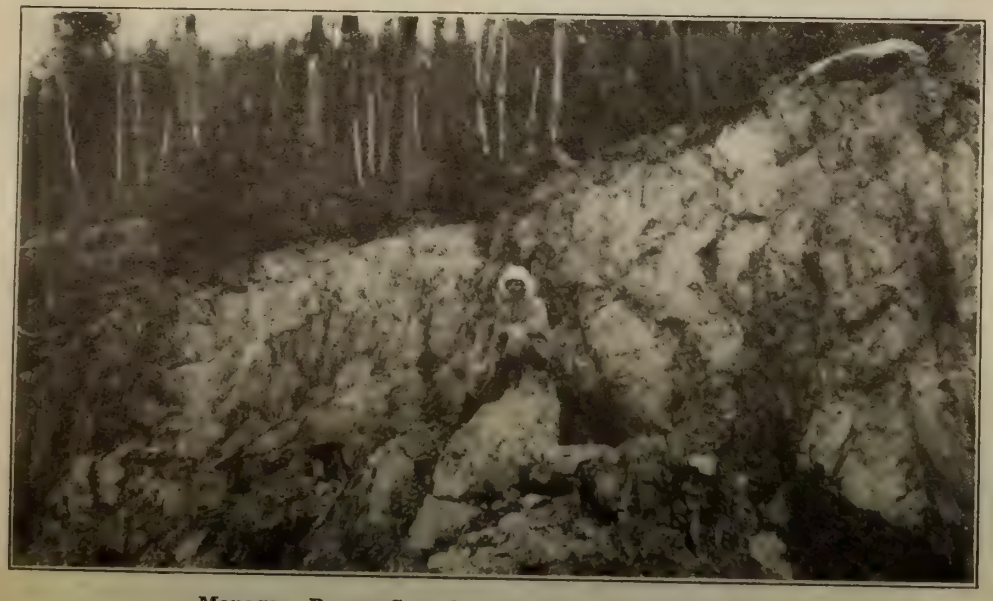
An out crop on the Wasapika Property. The quartz vein lies on the face of the outcrop.

Cutting Samples from a Vein in the Churchill Property.

An outcrop on the Wasapika Property.

On the Bennett Property.

The Wasapika Power House and Head Frame.



Manager Rogers Seated on Ore that Runs about $200 per ton.

The Bennett Vein and Shaft.

A Portage Scene on the Way to Wasapika.

Looking across Upper Wasapika Lake. This view shows location of workings on the Westree Property.

not apologize to readers of this journal for prefacing my remarks about the area by recognition of the fact that it takes men as well as ore deposits to make mines. To the propectors who located the claims and to those who are developing the deposits the people of Ontario owe more than they realize.

The Wasapika Area.

The area which I visited, and which I am here calling the Wasapika gold area, is a part of West Shining Tree area. The Wasapika property is south of Michikawakenda (nice little pickerel) lake. The Churchill is west of the south end of the lake. The Westre, formerly known as the Caswell, adjoins the Wasapika on the east end and extends north across Upper Wasapika lake, which is fed by the waters from Michikawakenda lake. The water runs east of Upper Wasapika lake to Wasapika Lake—an expansion of the west branch of Montreal river. The Atlas property is at the south end of Wasapika lake, and from its rocky promontory one may look across Wasapika lake and down the Montreal river. A short distance up the river, and on the east bank, is the Bennett property. The Adair property is south of the Wasapika and the Foisey is further south. The location of all the properties mentioned is shown on the accompanying sketch map.

Means of Access.

To get within 25 miles of the Wasapika area is an easy matter. The Canadian National Railway runs north-easterly across the country at that distance. The most used stopping place is at Westree, formerly known as Kashbaw. It is at present only a flag station; but will doubtless be soon a regular stop. Quite recently the need of improving service has been recognized by the placing of an agent at Westree station. Trains leaving Toronto at 9.15 p.m. reach Westree about 10 o'clock the following morning. Returning you leave Westree about 3 a.m., arriving in Toronto about 4.30 p.m. the same day. These trains run three days a week, leaving Toronto Monday, Wednesday and Friday.

From Westree to Wasapika there is a good water route, on which motors of the Evinrude type are advantageously used. From Ruel there is another good water route. A day's journey by water brings you from the railway to Wasapika mine. The portages are short and well cut out. It is a comparatively easy canoe route, and, by use of motors, it affords access to the gold area without any great hardship. It is a roundabout route, however, and double the length of the road which runs in a fairly direct line from Westree to Wasapika mine. At present the river is blocked with logs near Westree, but this condition of affairs need not be tolerated for long.

In less comfort, but with a saving of time, one may reach Wasapika by road. At present wagons are used on this road for half the distance, but for the remainder the road is usable only in winter. The Government now has a party of workmen improving the road near Westree, and it is understood that an effort will be made to make the road usable for its whole length this summer. Attention is at present being directed to improving the first half. This is much to be desired, but there should also be now at work the second half of the road another party of workmen. Otherwise it will be impossible to take in any heavy freight during the summer. I am advised that this part of the road will receive attention very soon.

The present method of getting in supplies is to use the road for half the distance, and use the water routes for the other half. At the halfway, a stopping place where meals and prospectors' supplies can be obtained has been established by Mr. Borland, of Toronto. Freight is carried on wagons to the half-way by freighters, whose charge is about $1.00 per cwt. From the halfway to the mines the various companies bring their supplies by motor boats and canoes.

On the water route to Wasapika, the lake which has given the name West Shining Tree to the district, is crossed. Here is another stopping place, the West Shining Tree hotel, run by Mr. Cosineau. Mr. Cosineau's place is also convenient for those who use the road from Halfway to Wasapika. Few use the road in summer time, however, except as a trail. West Shining Tree lake is a large one, with numerous islands; quite picturesque, with numerous rock outcrops exposed here and there along the wooded shores.

In the vicinity of West Shining Tree lake there have been several gold discoveries made. I did not visit the properties, however, and know them only by hearsay. It is understood that some work will be done on at least one of the properties this year.

Leaving West Shining Tree Lake, we followed a little stream for a few miles, then walking over a well-cut portage, crossing a small lake, walking over a second portage, and then taking the boat down another small stream, we reach Okawakenda (Big Pickeral) lake, and thench Michikawakenda Lake and the Wasapika mine.

The character of the country traversed is well indicated by the accompanying photographs, and I need not describe it at length here.

The Wasapika Gold Mine.

At the Wasapika mine there has been installed since my last visit a plant well suited for development work. The shaft is being sunk in the hanging wall, a short distance west of the outcrop of the Ribble vein. The rock coming from the shaft is fine grained, grey colored and somewhat schistose. It is well mineralized with pyrite. It contains much fine grained carbonate mineral, probably a calcium-magnesium-iron carbonate, and sericite. White quartz is encountered here and there in the shaft. I must more carefully study the rocks and ores before venturing to describe them fully; but from my observations I have no hesitation in saying that the formation is favorable for gold deposits, and there may well be a large body of ore in the hanging wall of the Ribble vein. Further geological examination and sampling must be done as development proceeds. I regard the results so far obtained as very encouraging. The shaft is an advantageous position for the continuance of development work. A capable superintendent, Martin Hassett, is in charge of operations. If nature has been kind and has sprinkled enough gold in the hanging wall the Wasapika will be one of Ontario's big gold mines. It would be foolish to say that the gold is there in sufficient quantity. The development work is being done with the object of finding out whether that is the case, as well as to test at depth the Ribble vein itself.

Just here it might be well to distinguish between veins and ore deposits. The quartz veins in the Wasapika area are very narrow—a foot or two is a good width. The ore deposits are, however, not all vein quartz; but largely silicated rock. The ore deposits,

vein quartz and rock included, are themselves commonly not more than a few feet in width for any length, but they are a minable width.

At the Wasapika, where most of the development work is being done, it seems not improbable that the ore deposit will prove to be very much wider than the Ribble vein. Should the ore deposit prove to be only a few feet wide, it may yet prove very profitable, for surface sampling indicates a good grade of ore in the vein quartz, and the silicated schist enclosing the quartz. There is a reasonable chance that there may be enough gold in the silicated hanging wall to make a very wide orebody. It is unlikely that the grade will prove to be as high as the well defined ore deposit immediately along the vein; but it looks sufficiently promising to warrant careful testing. Fortunately the shaft has been so located that such testing can be done economically while exploration of the Ribble vein proceeds.

The accompanying photographs show the Wasapika power plant, head frame and blacksmith shop. Just south of the power house there is under construction a small saw mill building.

It will be noted from the photographs that the Ribble vein outcrops on the side of a hill, and that there is low ground immediately to the west of the quartz vein, which strikes north. The shaft is west of the vein, and a narrow wet depression lies between it and the vein. To the north from the shaft, as shown in one of the photographs, is another outcrop, on the western face of which the vein is again well exposed. Similar outcrops occur on the claims further north and south, and one cannot escape the conclusion that the Ribble vein marks out a major line of fracturing. It is not unlikely that good ore occurs in several places along this fractured zone. It remains for exploration to determine where the orebodies are. Obviously diamond drilling must be resorted to if the low lying places are not to remain unexamined. It would be strange if only the best parts have been left exposed. Developments at the Wasapika will help to furnish a key for exploration of the properties north and south. The diamond drill can be used to great advantage in such exploration. A series of short holes properly located would give very useful information. Correlation of the drill cores with the openings at the Wasapika shaft should give helful guides.

Millar-Adair and Foisey.

South of the Wasapika there are outcrops of gold bearing quartz on the Millar-Adair and Foisey properties. No development work has yet been done on these claims. They are promising prospects that demand exploration. The main showing in each case is a white quartz vein at the eastern edge of low wet grounds. They are fit subjects for the diamond drill. Holes started to the west of the line of these outcrops and driven towards the line might disclose important orebodies. There is no certainty that they will do so; but there is a reasonable chance.

The Northern Extension of the Ribble Vein.

North of the Wasapika property there are outcrops of the Ribble vein on claims owned by George R. Rogers. These properties are yet to be explored. A little stripping has been done, and Mr. Rogers states that his surface sampling has shown good values in several places. The claims merit attention, and they will doubtless receive it later on.

The Westree.

The Westree property lies on either side of a narrow lake which drains into Wasapika lake, and which for convenience I am calling Upper Wasapika Lake. The accompanying photographs show the location of the shafts and of the camp buildings with reference to the lake. Some of the photographs will help the reader to visualize the character of the country. Others show, at close range, the nature of the ore deposits. The properties were formerly known as the Caswell.

From the abandoned workings on the north shore of the lake a considerable quantity of rich ore was taken out by former owners. As far as can be seen there has been little development work done other than that necessary to remove a rich pocket of ore. One of the photographs shows the size of the dump, a fair measure of the amount of excavation work done. Extending northerly from the shaft there is a fissured zone. One of the photographs shows the fissured zone at the shaft, and another photograph shows similar fissuring at an outcrop a short distance north of the brow of the hill. Other photographs show the ore deposit at a second shaft on the south side of the lake. There is no big quartz vein in this fissured zone. The ore deposit includes more rock than quartz. In places the narrow quartz veins are very rich, and there is little doubt that some small high grade shoots will be exposed during development. The future of the property depends of course on the average value of the deposit over a minable width, and the result of development work under the lake. The individual veins are short as well as narrow, but there are several narrow ones in the fissured zone. The fissured zone is itself not strongly marked a short distance south of the shaft. The natural course in testing the property is to sink on the ore deposit at the south shaft and drive under the lake toward the northern workings. The prospect shaft is now being enlarged preparatory to sinking. Some of the quartz broken during this operation is liberally sprinkled with gold.

At this early stage in development it would be rash to make predictions, but there is a good chance that the Westree will prove up favorably if its owners are prepared to risk some money on systematic exploration. The property, like most mines in the early stage, would never be developed by anyone who was unwilling to take a chance. Under the direction of Mr. Rogers and his superintendent, Mr. Hassett, the development work will be, we feel sure, well done.

While attention so far has been chiefly directed to the immediate vicinity of the two shafts, there are numerous other outcrops on the Westree that deserve attention. There are quartz veins and fissured zones that warrant surface work being done on them. One prominent vein exposed at the east end of the lake will probably be encountered in the drive across the lake.

The Herrick.

The Herrick property consists of several claims on the west side of Michikawkenda lake. Since my last visit a shaft has been sunk to a depth of 50 feet on the Kingsley vein. This is one of what were formerly known as the Knox claims. The deposit was briefly described by the writer in the Journal in August,

1918. At the shaft the vein has a well defined vertical wall. The shaft has been timbered and the surface outcrop has been covered with rock in levelling around the collar. The dump shows the rock excavated in sinking the shaft to be a greywacke, a fine grained grey-colored sedimentary.

The vein matter is chiefly quartz with some calcite and small particles of pyrite. On the fracture faces there is a soft dull green mineral that looks like serpentine. There is a thin layer of pale brownish grey calcite on some of the fracture surfaces—evidently a secondary filling. The vein matter is said to show good values for a minable width in the shaft. Samples show high grade ore in the shaft for a width of 5 feet. Mr. Rogers, who is consulting engineer for the Herrick, has sampled the vein as exposed in the shaft. I am advised by Mr. F. C. Sutherland that the samples show high grade ore to the bottom of the shaft.

The Herrick ore deposit is a well defined vein. The surface sampling showed good ore, and the development work has exposed such ore to a depth of 50 feet. Further development work by shaft sinking and drifting may very reasonably be expected to prove up an excellent orebody. I understand that this work will be undertaken as soon as the necessary machinery can be taken in. Exploration by diamond drilling will be begun shortly. I look for interesting developments at the Herrick this summer, and will be surprised if development work does not prove similar ore at depth. Changes in rock formation accompanied by changes in character of the fissuring are to be expected as development proceeds.

The chances of making a small profitable mine at the Herrick seem very good. There is also a good chance that it may become a big mine.

Other Properties.

There are a number of promising properties in the area in addition to those I have mentioned above. I made brief visits to some of them—the Churchill, Queen of Sheba and the Bennett.

At Churchill some work has been done on a vein exposed along the southern edge of an andesite outcrop. The vein strikes west. The accompanying photograph shows two men at work cutting samples. I know so little about this property that I do not care to venture an opinion about it.

At the Queen of Sheba, north of the Churchill, there was no work being done. A few minutes spent at the outcrops showed a deposit of different character from those already described. The ore is red with iron rust, and when broken shows an abundance of fine grained pyrite. The rock is a felsite with the glassy appearance and clean fracture of the more siliceous volcanic rocks. In places it has been squeezed laterally into sericitic schists.

The Bennett vein, on the Bennett claims east of the Montreal river, is shown in the accompanying photographs. It is undoubtedly rich, and should be carefully tested. I have not seen the assay plan, but the presence of much gold is easily detected in parts of the vein. Some of the structural features, and the topography of the outcrop are indicated by the photographs. It will be noted that the location is very favorable for mining the upper part of the ore deposit, and that the deposit could easily be tested at depth by short diamond drill holes. At the time of my visit H M. Roberts and Wm. Smith were examining the property for the E. J. Longyear Company. The Bennett is the only property east of the Montreal River that I visited on this trip. The ore and wall rocks are of similar character to those at the Wasapika. The quartz vein shown in the photographs is enclosed in grey andesites. Near the shaft it is distinctly faulted. At another place it is crossed by a narrow basaltic dyke. In either direction along the strike are masses of diabase.

Among other promising properties in the area are the Atlas and Saville-McVittie. I have not visited these recently. A number of men are at work on the Atlas.

Present Surface is a Mere Incident, Not a Governing Factor in Life History of the Ore.

The gold in the ore deposits here described is certainly not present as a result of concentration at the present surface. I do not believe that the present rock surface existed when the ore was deposited in the form in which it is now found. The present surface has no genetic connection with the ore deposits, and there is no good reason to fear the bogey of "surface enrichment." The ore exposed near the surface is of a type that is formed at depth and similar ore may confidently be expected to occur for any minable distance downwards. I do not mean to suggest that values will be uniform. I don't know whether they will be lower or higher, but I do believe that the conditions are favorable for the occurrence of deep ore deposits in which ore of similar mineral composition to that near the surface will be found at any depth to which mining operations can be carried. The individual deposits will doubtless vary in depth as they do in length, but the present surface is a mere incident in the lives of these ore deposits—not a governing factor.

A Promising Area.

After a second visit to Wasapika I still regard the area as one of great promise. There are difficulties to be encountered in developing the deposits, for they are 25 miles from the railway and the roads are not yet in shape for use in summer. There is as yet no large amount of underground work done, and there is a chance that when done it will prove disappointing. Some of the properties need to be tested by diamond drilling before one may even guess at their value. There are many things to be done, and the result of doing them is uncertain; but the work that has been done has given results that should prove encouraging to those who are willing to risk something in a bold attempt to make mines in the wilderness. To such adventurers I would strongly recommend this area. The deposits are promising enough for the venturesome, but not yet sufficiently developed for those who think they cannot afford to or will not knowingly take a chance.

OTHER WASAPIKA VIEWS.

Second International Mining Convention, Nelson, B. C.

Reported by our British Columbia Correspondent.

The annual International Mining Convention of the Pacific Northwest was held on the 19th, 20th and 21st of June at Nelson, B.C., and was attended by representatives of the industry from all sections of the British Columbia Interior and from the State of Washington.

Hon. Wm. Sloan, Minister of Mines, was present and informed the delegates that it was the policy of the Provincial Government to offer every encouragement to Capital, it being appreciated that this was essential if the country's mineral riches are to be developed. Taxes might be considered high, but they were not as much so as in the neighboring States and the Government was looking forward to the time, which he trusted was not far distant, when assessment would be based only on net incomes.

One of the Convention's features was the announcement that the Committee appointed to investigate the charges against the Consolidated Mining & Smelting Company of placing its rates of treatment at such a figure as to impose a great hardship upon shippers of ore, had found the company "not guilty." This was followed by a suggestion from the company's officials that they and the independent shippers should get together to consider and settle their differences as well as to solve their joint problems.

There were a number of valuable papers, dealing with all phases of mining activity, and F. A. Starkey, the Convention Manager, and his Associates were congratulated on the able manner in which the event was organized and carried through.

First Day's Proceedings.

Organization of C.M.I. Branch for B.C. Interior.

The first day was employed in the organization of a branch of the Canadian Mining Institute for the British Columbia Interior. Mr. S. S. Fowler, Manager of the Blue Bells Mines, near Riondel, B.C., was selected to act as Chairman and explained that the purpose of the proposed branch was to give the mining men of the Eastern Districts of the Province a medium for the consideration of problems which were constantly arising relative to the industry and for the impression of their views, with the support and influence of the Canadian Mining Institute, upon those in authority in Government or otherwise. He was sure the importance of this would be recognized and that those associated with the development of the industry would co-operate in order that the move might be made a success. These views generally speaking were endorsed, and some suggestions made as to how the usefulness of such a Branch could be emphasized, by Dr. E. T. Hodge, Professor of Mining at the University of British Columbia, Ernest Levy, James Anderson and R. R. Bruce. It was pointed out that heretofore matters relating to mining in the Kootenays had been dealt with by organizations not directly affected and only indirectly interested. For these reasons it was decided, without opposition, to launch the new organization and the necessary formal steps were taken, officers being elected as follows: S. S. Fowler, chairman; W. G. Wilson, secretary; executive committee, James Anderson, Kaslo; Randolph R. Bruce, Windermere; A. G. Langley, Revelstoke; F. S. Peters, Rossland and S. G. Blaylock, Trail, B.C.

Other events of the day were of a purely preliminary character. The Mineral Exhibit, which was housed in a canvas structure on the main street of the city, was judged. This was a representative display of the mineral wealth of the Kootenay and Boundary Districts of the Province. Most of the well-known properties were represented and the variety, as well as the quality of the specimens shown, were the subjects of favorable comment by visitors. After the session to which reference has already been made a reception was tendered a body of delegates from various parts of the Province, including the Coast, who came by steamer up the Arrow Lakes. Nelson is situated on the West Arm of the Kootenay Lake, a chain of inland waterways from which rise very beautifully timbered hills and mountains. The citizens are enthusiastic yachtsmen, canoeists, and motor boat devotees. There is available, therefore, quite a large mosquito fleet and this was mustered to extend welcome to the incoming mining men. It cruised down the water, greeted the regular steamer with all whistles and horns procurable, and turning escorted her into harbor. It was a striking scene, as the rays of the sinking sun were reflected on the placid waters and the varied colors of the mountain and hill sides were thrown into relief, while the little craft churned their way into the quaint little City of Nelson, the mining centre of the interior of one of Canada's greatest mineral producing provinces.

Proceedings of Second Day.

On Friday, June 20th, the Convention got into full swing. The delegates about two hundred strong assembled at the gaily bedecked City Hill to listen to addresses of welcome from Mayor J. A. McDonald, who figuratively handed them the keys of the City. Hon. John Keen, Speaker of the British Columbia Legislature, was another of those called upon. Himself a pioneer among pioneers, one of the sturdy band who had a hand in the opening up of the Slocan District, a man direct in speech, uncompromising in his statement of fact, and possessed of a sense of humor which makes his public utterances features of all important gatherings of western mining men. Mr. Keen bade the delegates welcome in warm terms. He said that the City of Nelson admittedly was a delightful place and no doubt they would have a good time. But there was another city, which wished to be remembered—Kaslo, the Mother City of the Kootenays. For some reason she could not have the Convention and so was glad that it went to Nelson, her largest suburb. (Laughter.) The delegates could thank God that there were not living in the years 1891 to 1894. Then they did not have the learned geologist and the equally learned metallurgist to tell them when they were wrong. True these accomplished men did not tell them when they were wrong till after the event even today, but nevertheless their advice was available and unquestionably it was invaluable. (Laughter.) There were some of them present and he could assure them that what he said was not intended in any but a complimentary sense. To the visitors from Spokane and other points on the American side he wished to extend a special welcome. Their co-operation was always appreciated. They had done good work in

he past and would continue in the path of industry and irtue. It had been Spokane mining men who had done large part in the development of the Slocan in the arly days. British Columbians had never forgotten hat and the latters' sense of obligation had been so reat that they had turned around and constructed Spokane, one of the great industrial centres of the State of Washington. "Let us continue hand in hand," advised Mr. Keen, "remembering that the important things are to find and recover the ore and then obtain for it the best possible price."

Remarks of the Secretary A.I.M. & M.E.

L. K. Armstrong, Secretary A.I.M. & M.E., expressed appreciation on behalf of himself and associates, the majority of the City of Spokane, on the hearty manner in which they had been received. He declared that Mr. Keen's observations regarding Spokane were founded on fact and the fact was appreciated, generally, by the citizens of that city. He had heard it stated, and believed it to be true, that that City would be but a village were it not for the mines of the Kootenays and the Boundary of British Columbia. It was said that its extent and its business was about 80 per cent due, either directly or indirectly to the mining industry. The interests of the producers of the Province and of Spokane, therefore, were closely allied and he was sure that they would in the future work together in an ever larger degree than they had in the past. In closing he delivered a message of goodwill and regret at his inability to be present from Phillip M. Moore, former president of the American Institute of Mining Engineers, who had attended the last Convention in Nelson and recalled his experiences on that occasion with extreme pleasure.

L. O. Howard, of the College of Mines, Washington State College, spoke briefly, referring to his pleasure at being present and stating that he came, not to lecture, but to learn.

Joint Meeting A.I.M. & M.E. and C.M. Inst.

In the afternoon there was a joint meeting of the A.I.M. & M.E. and the C.M.I., Mr. Fowler occupying the chair. Three interesting papers were read as follows: "Mining Methods at the Granby Mines, Phoenix," by C. M. Campbell, E.M.; "Nodulizing Copper Concentrate," by Oscar Lachmund, E.M., Spokane, Wn.; and "Tunnelling Reminiscences," by Major Angus W. Davis. Summaries of the two former are subjoined while the reference suffices for the latter inasmuch as it was read before the recent annual meeting of the Western Branch of the C.M.I.

Mr. Campbell's Paper on Granby Phoenix Mines.

Mr. Campbell's paper was illustrated by lantern slides. He stated that the first of the camp's claims, the Knob Hill and Old Ironsides, were staked by Henry White and Matt Hotter in 1891. There followed a period of comparative inactivity, marked by intermittent development until in 1901 a consolidation of mining and smelting interests resulted in the formation of the Granby Consolidated Mining & Smelting Company. The first ore was shipped in July, 1900. Between then and June 14, 1919, about 14,000,000 tons were shipped. From 1910 to 1916 daily shipments averaged 3,000 tons; while in 1912 and 1913 the daily average output was 4,000 tons a day. Mr. Campbell went into the geological conditions of the district and enumerated some of the bigger problems which the company's staff had to overcome. He stated that the mining costs, were exceptionally low and that it was possible to win and to successfully treat very low-grade ore at a profit. Efforts were made constantly to reduce the costs with such satisfactory results that as conditions changed, and the methods in use failed to yield a profit on the class of ore being handled, there were new methods ready to further decrease operating expenditure to such an extent that mining could be maintained and divi-

International Mining Convention, Nelson, B.C., June 19-21st, 1919. Delegates outside Convention Hall.

dends paid. As an instance he mentioned that timbering costs were cut in two years from 34 to 4 cents and later to 2½ cents per ton. And this was done, it was stated, with increased safety to the men. Views were shown of the town of Phoenix, shipping terminals, of underground workings showing stoping methods, the filling of stopes with waste, and electric shovel operations.

Nodulizing Copper Concentrate.

The preparation of copper concentrate for the market, stated Mr. Lachmund is a problem that confronts the British Columbia producer today, assuming that it is the intention ultimately to smelt all domestic copper ores within the Province.

The only market for such material was some outside reverberatory smelting plant as there were no such plant within the province. This meant high railroad freight charges owing to the high moisture content of the concentrate, or an appreciable loss of fines in transit if the product is dried before shipping, to say nothing of the additional cost of drying. He said that as there were several glass-furnace smelting-plants in British Columbia the logical method was to put the concentrate in proper physical condition for blast furnace practice. Three methods were suggested, namely, briquetting, sintering and nodulizing. The first he did not think very satisfactory as briquettes did not lend themselves to transportation. Sintering the sulphides in roasting pans or pots, he declared, made an undesirable product for British Columbia blast-furnace practice as far as retaining the sulphur is concerned, it bringing the percentage down as low as five.

Taking up nodulizing, that is getting the fines into round particles or nodules by passing the material through a revolving cylindrical furnace or kiln under application of heat, he said that it had been successfully carried out at several large plants.

He instanced the United States Metals Refining Company at Chrome, New Jersey, which had used the method on a large accumulation of flue dust, and later on flotation concentrate. The copper concentrate of the Braden Copper Company in Chili as well as the flotation product was being handled through the rotary kiln.

After quoting a number of authorities, Mr. Lachmund, said that it appeared that nodulizing the fine ores, flue dust and sulphide concentrate is the solution of the problem of preparing this material for the market where reverberatory furnaces are not available. In fact under average conditions smelting the nodules in the blast furnace can be done more cheaply.

He told of the series of experiments which he was called upon, recently, to supervise in British Columbia. For the preliminary work, a sheet iron tube 12 inches in diameter by about ten feet in length was used, and this was not lined with firebrick or other refractory material as only small lots of concentrate were tried at a time and each test was of short duration. The results indicated that a certain amount of the desirable products could be made in this way, but the apparatus was too small and crude, and fuel control too uncertain, to keep it up for any length of time, and no tests were made as to sulphur elimination, as the main object was to ascertain whether nodules could be made. Having determined this, the process was tried on a larger scale, the plant of an idle cement works being used. This consisted of a cylindrical revolving furnace 125 feet long by 7 feet in diameter inside the fire brick lining and a coal crushing plant, the fuel used being powdered coal.

In telling of this experiment, Mr. Lachmund said that he had never heard of powdered coal being used for nodulizing copper-sulphite concentrate and consequently he and his associates were not very sure of themselves. It appeared to them that fuel oil was out of the question, the concentrate available being limited and the plant not being arranged for burning fuel oil. However, the former Superintendent of the works was familiar with coal dust firing and the experiments were initiated. It was discovered in the first place that the temperature required to be lower for making nodules from concentrate than it did in the dry process cement practice of calcining clinker. The burner was too large and the fuel feed difficult to control, the result was that there was produced everything from fine roasted dust to lumps of partially smelted material as large as a man's fist. However some good nodules were made which seemed to him to show that powdered coal could be used successfully as fuel providing that proper equipment is used. He said that coal dust firing was being used at reverberatory works and also under boilers of various types and that a similar arrangement no doubt could be worked out for a nodulizing kiln.

Dealing with costs he said it was impossible to obtain favourable working conditions always and the total expense could not be charged against the operation. An effort was made to obtain representative cost figures when the kiln was doing good work, but they were more or less estimates. Between 12 and 14 tons of concentrate were treated with one ton of coal. He figured the coal at $5.00 per ton pulverized and in the bin, and thought the cost of concentrate nodulized should not exceed 50 cents. To these figures, however, would have to be added overhead and other expense items amounting to about 50 cents perhaps, and making a total of $1.00 per ton. He said that the capacity of a kiln 125 feet long such as had been used in these experiments should be about 100 tons of concentrate a day.

In closing, Mr. Lachmund commented on the rapidly gaining popularity of powdered coal as fuel and asserted that this should result in making certain so-called semi-lignite coal of Western British Columbia of commercial value. He also surmised that any future discoveries of large copper deposits in this province probably would be of so low a grade as to require water concentration. It would therefore be necessary to ship the concentrate to a smelter and he did not think that anything could be more desirable than the installation of such a plant as would permit the driving of the moisture from the product and as much sulphur as was undesirable. Not only would this give the smelterman a very attractive material for his plant, but would save the operator substantial freight charges.

Consolidated Smelter Charges—Committee's Finding.

Mr. Fowler explained that, as Chairman of the Committee appointed to investigate the justice or injustice of the charges levied by the mangement of the Consolidated Mining & Smelting Company on custom ore treated at the Trail B.C., Smeltery, he had been asked to give a summary of the Report of the committees which had been forwarded to the Minister of Mines at Ottawa. He recalled the circumstances attending the appointment of the Committee which included James Anderson, of Kaslo, B.C., and Ivan DeLashmutt and himself. Something over a year ago the Consolidated Mining & Smelting Company announced that conditions made it essen-

tial that a new schedule should be applied to ores received for treatment. Following this "Schedule B." was issued imposing higher rates on lead ores. Considerable dissatisfaction was manifested by operators and mining men generally and the company became the subject of such criticism that the matter was taken up by various public bodies, among them being the Board of Trade for Eastern British Columbia. Representations to the Dominion Government at Ottawa finally led to the endorsation of the proposal that an investigation be instituted and the Committee as indicated had been authorized to proceed with the work.

The inquiry had been pushed forward with all possible expedition and the Committee had been given every possible assistance by the officials of the Company. Mr. Fowler emphasized this point. It was a matter of satisfaction to him that the company's books had been thrown open to the members of the Committee without reserve and nothing withheld.

The conclusion reached was that the company was justified in the increases enforced at that time. It had been justified, in the Committee's opinion, because it was shown that the smelter had not been making a profit. What profits were made were coming, not from the smelter, but from the mines, the property of the company and operated in connection with the smelter. There had been a time, it was true, when the smelting as such had been profitable. That was when there was available, close in and around the plant, ore of exceptionally high quality, among which could be instanced that of the Saint Eugene Mine. This, however, had become exhausted and conditions had gradually and completely changed. With the exhaustion of this mine it had been necessary to develop some permanent source of supply of ore for the smelter, a source which could be depended upon. The smelter management considered that it now had accomplished this in the Sullivan Mine.

Then there were to be considered the increased costs both of material and of labor. But, aside from the question of costs, as the market quotation on silver began to go up the quantity of zinky silver-lead ores received for treatment increased. The ratio of lead to zinc for satisfactory smelter handling should be about 9 to 1 in the slag but this, it appeared, was far from being the situation in which the company found itself. Their action, under the terms of "Schedule B.", made its effect felt in 1918 and on September 30th of that year it was found that the ratio of zinc to lead in the ores received had been reduced by approximately 50 per cent. It followed that the conditions in the furnaces and generally were much improved. Metallurgical experimentation with these ores had been in progress in the interim and, as a result, he was able to state that the company now was engaged in the preparation of "Schedule C." which, he understood, would mean a reduction of about $3 a ton on the average custom ore treated. This meant approximately $120,000 a year. He would not say that the company was giving it to the operators, or to those to whom it would go. The company could afford to take this action, or else it would not undertake it. But it was an evidence of its good faith. He thought the new schedule would be effective as from the 1st of July and believed that the change would be appreciated by the mining fraternity of Eastern British Columbia.

Remarks by Smelter Officials.

Mr. Bingay, of the Consolidated Mining & Smelting Company, said that he thought it was generally understood in 1918 that when the smelter solved its zinc trouble those ores which had been affected by the increase would have the load relieved. There seemed, he said, little appreciation of the fact that at the time these increases were announced there were decreases in charges on certain class of ore used for the reducing of large zinc contents. With improved metallurgical methods, and the use of these diluting ores, it was possible to state that another schedule was in preparation which would be issued very shortly and go into effect without delay. He was not prepared to go into details. These were to be discussed and decided upon at a meeting between himself, other officials of the company, and the members of the investigating committee. There was no doubt, however, that there would be reductions. It was the intention to inform each shipper to Trail by letter of how the proposed changes would affect his particular class of ore, so that all would know just where they stood and there would be no reason for misunderstanding.

General Manager Suggests Co-operation in Marketing Zinc.

Mr. J. J. Warren, the Company's General Manager, made a plea for closer co-operation between the company and the shippers of the Province. He said that Mr. Blaylock informed him that the company would be producing shortly 75 tons of zinc a day. The Canadian market was 40 tons a day. What was going to happen to the other 35 tons and what was to become of the product of the independent shipper? There was only one solution, namely, the search for foreign market and the acceptance of lower prices. The point could not be evaded. It was the company's policy to share fairly and evenly the Canadian market with the independent man, and it wanted the latter to show a willingness to share with it the loss resulting from the lower prices obtained outside the Dominion. It was the same with regard to lead and copper. This was a reason why he thought it in the interests of both to come together for a discussion of matters generally relating to the industry. There not only was the question of market but other common problems such as duties, embargoes, labor, etc. All of these, and many others, affected both the company and the independent shippers. It was in their interests to get together and to cooperate. Now that the company had been given more or less a certificate of good character he thought this might be arranged. He did not favor Government ownership and did not think it would be a good thing for the industry to have a Government official, who probably knew nothing about it, at the elbow of the management giving instructions as to how the smelting should be done. The company was not going to be satisfied until the Trail plant was made the best of its kind on the American continent in point of efficiency and of service. It was faced with all manner of difficulties. The attaining of such a goal would require the patience of a Job and the persistence of the Devil. But the company had them both. (Laughter.) "Now," he concluded, "I have presented the olive leaf, or rather the olive tree, you may accept or reject it."

Nicol Thompson, of Vancouver, B.C., and R. R. Bruce of Windermere, commended the Committee on its work. They also endorsed the suggestion that the Committee should be made permanent. That such was proposed had been indicated by Sidney Norman, of Spokane, in the course of a few remarks in which he expressed his gratification at the conclusions reached by the investigators and hoped that the Government would continue in office a Commission, the duties of which

would be to keep in touch with the smelter management and act as an intermediary between it and the shippers. He, and the majority of those who expressed themselves, thought the idea a good one, Mr. Bruce asserting that only in such a way could it be hoped that the good relations between the two would be preserved and without such good relationship the mining industry would be much handicapped.

Third Day.

Mr. Camsell on Geology of B.C. Gold Deposits.

When the Convention reassembled on the morning of Saturday, June 21st, Mr. Nicol Thompson, Cahirman of the Bureau of Mines, Board of Trade, Vancouver, presided and called upon Mr. Charles Camsell, of the Dominion Geological Survey, for an address on geological features of the gold deposits of British Columbia.

Mr. Camsell first commented on the falling off of production and the reasons therefore as commonly understood and pointed out that this was found so alarming that a commission was formed in England to discuss the problem of aid to the industry and in America proposals were made either to increase the value of an ounce of gold or to grant a bonus to producers. He spoke of the opinion of some students of political economy that it made very little differ-

From the hills above Nelson, B.C., with the Kootenay Lake in background.

ence how much gold was produced as long as there was sufficient production of other things. This matter had been discussed at meetings of the Canadian Mining Institute and the speaker thought that among mining men the opinion was unshaken that it was very necessary to produce more gold.

Mr. Camsell quoted statistics of world gold production during the last few years and said that the influence of war and the high cost of mining had had the same effect in British Columbia as in other countries. This was best illustrated by the actual figures, which are:

Gold Production of British Columbia.

1915	$5,937,934
1916	5,167,834
1917	2,863,190
1918	3,558,895

He explained that the increase in 1918 over 1917 was due to one new mine which had not before produced, the Belmont Surf Inlet Mine. This unsatisfactory condition was, in the opinion of many familiar with the extent and possibilities of the province, only temporary. Continuing, Mr. Camsell said, "It is not exactly safe to argue because each mile of the Cordilleran chain to the south of the Dominion has produced so much in mineral wealth, that an equal amount per mile will be found in the Canadian portion. H the difference is as yet so great and so much of country remains to be prospected that we can w afford to feel that our production in gold as well as other metals must increase until the difference i mile is greatly reduced. This and other conditio therefore, lead one to believe that as soon as ind trial unrest is settled, we will have reached the dow ward limit of gold production in this province a any change will be for the better."

The same was not considered to be the prospect the United States, according to some of the b authorities, but it was being urged there as a patrio duty to produce gold in spite of difficulties and d couragements in order to maintain their gold reser and the credits based thereon. "The same duty," M Camsell said, "devolves on Canadians and I wou earnestly urge prospectors to devote more time a effort to the discovery and development of gold d posits."

Age of B.C. Gold Occurrences.

Having made a few observations relative to t geological occurrence of primary gold deposits on t North American Continent, the speaker stated th practically all of the gold deposits of the province b longed to the second or younger period of mineraliz tion and that the whole production of gold is ma from these deposits. They were all believed to closely related to the great intrusions of plutonic roc that took place in the Jurassic period, and were for ed at the time of intrusion or shortly afterwards. Som of them appeared as contact metamorphic deposi formed on the border of the igneous bodies, but mo of them occurred as veins both in the igneous and the intruded rocks in a zone surrounding the igneo bodies.

"No workable gold deposits have been as yet d veloped," he said, "in British Columbia whose orig may be attributed to the early Tertiary period su as are found in Colorado, Montana, Utah and Idah or to the later Tertiary as the Bonanza deposits Nevada and portions of the adjoining States and Mexico.

"From 65 to 75 per cent. of the gold produced in th Province of British Columbia is obtained from th smelting of copper ores, but in describing or discus ing gold deposits in this paper we only propose t consider those deposits in which gold is the princip metal obtained. Placers too need not be considere since they are secondary and derived from erosio from the primary deposits."

Mr. Camsell then dealt fully with each of the gol bearing districts of the province, and in concludin advised that in searching for gold a district shoul be selected where it is known to occur in lode form or where the streams carry placer gold.

Mr. Sloan, the Hon Minister of Mines, addressed th Convention.

Hon. Wm. Sloan, Minister of Mines, who was we received expressed his pleasure at being present a such a representative gathering of the mining men o the Northwest. There was no doubt that the City o Nelson was one of the most charming communitie of the Provincial Interior. He had enjoyed his vis and wished to acknowledge the hospitality of whic he had been the recipient at the hands of the citizen and those associated with the Convention. In this con nection he mentioned particularly Mr. Fred Starke the manager, and his associates. He congratulate

the former upon the able manner in which the arrangements had been carried out. As Minister of Mines he also extended greetings to the delegates who had come from the south of the line. As has been noted at a recent similar Convention it was pleasing to observe the interest manifested by the mining men of the neighboring states in the development of the minerals of British Columbia. Their co-operation was welcomed and appreciated. They had fought shoulder to shoulder in France in the settlement of the great problem of the ages, namely, the maintenance of democracy, of free government by the people, and now were prepared to face shoulder to shoulder, the problem, almost of equal importance, of restoring settled conditions and developing the illimitable resources of America.

There is, as you are all aware, a condition of unrest in Canada, as well as in other countries, at present. I want to say that this is not an uncommon manifestation after the disturbance of such a war as that through which we have just passed. Rather it is what might have been expected, inasmuch as it has been the experience in Great Britain, although perhaps not quite to such an extent, after previous and comparatively recent wars. In my opinion it will not be very long before the life of the country becomes normal. Certainly it must regain its equilibrium if we are to take up the work of our daily lives and continue along the lines of industrial development and general progress. Looking back it is gratifying to remember that the British Empire always has emerged from conflicts greater and stronger than ever before. Moreover, the various outlying parts of our Empire, through the trials of the past four years, are not more closely welded and more determined to stand together than at any time in their history.

Provincial Government Aims to Stabilize Industry.

The aim of the Provincial Government, to pursue the subject of conditions and their settlement, is to establish the best of relationship between Capital and Labor. Only by so doing can it be hoped that the best results be obtained in the development of our natural resources and this refers in especial to the great milling industry. The mining business is more or less a precarious one and it is appreciated that capital must have all reasonable assurance that it will receive consideration when placed in legitimate enterprise. When in New York recently I had many inquiries as to the situation in this province and the prospects for profitable investment and am therefore certain that, as soon as the industrial unrest to which I have referred and of which we all are so painfully aware subsidies, we shall be able to take up the work confident that ample capital will be available. It is a matter of outside comment that the mining laws of British Columbia are fair and just, and of such a character as to encourage the capitalist to find in the development of its minerals as safe a field for investment as is to be found anywhere. In the matter of taxation I may say that the policy of the government is to base its assessment to a constantly greater degree on net incomes alone. At present, unfortunately, there are not enough considerable net incomes to make this possible and to pay the bills. That, however, is what we have in mind and those of us who are complaining of high taxation should remember that it is still higher in the adjacent United States.

Government Ore-Testing Plant.

While in Ottawa I took up with the Hon. M. Burrell, Minister of Mines, the matter of the establishment in British Columbia of an Ore Testing Plant.

It is not necessary for me to say much to the mining men of the Nelson District of the necessity for such an installation. There has been an agitation for one here for many years. Mr. Burrell informed me that it was the Government's intention to begin work on such a plant, the required finances having been provided by the Dominion Parliament. It was undecided at the time whether it would be placed at Nelson or the Coast, it would be proper that it should be made an adjunct of the University of British Columbia. Personally I should have preferred that the province have a School of Mines, but we have embarked on a more ambitious enterprise, namely, the establishment of a University that will be a credit to this great western country. But I know of the difficulties experienced by mining operators in this section because of the lack of such facilities for the determination of what class of mill should be provided for the treatment of their various kinds of ore and there is no doubt that an ore-testing plant is a necessity in this district.

It is interesting, in touching on the complexity of some of our ores and the consequent difficulty experienced in effecting full recovery of their values, to recall a statement made in Nelson a few weeks ago in the presence of the President of the Canadian Pacific Railway, Mr. Beatty, by Mr. J. J. Warren, the General Manager of the Canadian Consolidated Mining & Smelting Company. He stated that Mr. Blaylock, of the company's metallurgical staff, and his assistants had discovered a process by which silver, lead, and zinc can be recovered from the Sullivan Mine Ore. He also is reported to have said that the problem of the treatment of the low grade gold-copper ores of the Rossland Mines had been solved and that within a short time the Rossland Mines of the Company would be turning out between 2,000 and 5,000 tons of ore daily.

I sincerely trust that I have correctly interpreted the purport of these statements. The first should mean much to the operators of properties, of which there are not a few with ore similar generally to that of the Sullivan Mine. The second should result in the bringing to the historic mining camp of Rossland that prosperity which she had enjoyed for so many years and which we all are interested in seeing continued.

In referring to this improved process I may say that while in Brooklyn recently I was interested in witnessing in operation a new flotation process, known as the alkaline process. The experiments appeared to show that oil could be satisfactorily supplanted by alkali, by the method for which patents have been secured. Those controlling this process have informed me that they are coming to British Columbia to demonstrate it in the treatment of some of our complex ores, and it will be interesting to watch the results of this work.

Iron and Steel Industry in B.C.

With respect to the Iron and Steel Industry to which as Minister of Mines I have devoted much attention I may say that we have on the Coast and elsewhere large deposits of magnetite ores. These are of exceptional purity. We have been handicapped by the lack of hematite and for that reason I was struck with a specimen of red hematite in the Nelson Exhibit. I have given instructions to the District Engineer to examine the property from which this sample was taken and to report fully. As to what has been done,

must if you are familiar with the Bounty Act passed by the Provincial Government grant a bonus of $3 a ton on pig iron produced in the province from local ores. This so far has not given the results hoped for. Our action was followed up by an investigation of the possibility of the development of our iron ores by electric smelting, and Dr. Alfred Stansfield, an authority, was commissioned to come to the province and report. This he has done, and his report indicates that our magnetites can be so treated, but that the cost of power stands in the way of making the enterprise a commercial success. Recently an electric-smelter expert came to the Government and stated that he had an improved method by which it would be possible to treat our ores more economically. As the Government is much interested in this possibility a small grant was made in order that this method might be demonstrated and the results of the experiments will be known at an early date.

Government Aid in Construction of Roads and Trails.

When taking the office of Minister of Mines one of my first actions was to introduce the Mineral Survey & Development Act, dividing the Province into six mineral survey districts, each of which districts was placed in charge of a competent engineer. The duties of these engineers were to aid the prospector and the operators in every way, and I believe the policy has proved satisfactory. Among their responsibilities is the examination of such properties or prospects as require trails, or roads, to facilitate development. If the reports of our engineers indicate that the properties have merit and should be encouraged the Government authorizes an appropriation to aid in the furnishing of means of transportation. In this work we have spent $207,535 in a little over two years, built 98 miles of mining roads, overhauled 437 miles of mining roads, built 75 miles of trails, and overhauled 420 miles of trails. The only complain I have received, as a matter of fact, is that the engineers have been unable to cover their districts thoroughly enough and this refers particularly to the district in which are the East and West Kootenays. So marked is this that I have come to the conclusion that your district engineer, Mr. A. G. Langley, must either have expert assistance or that the district will have to be divided into two. (Applause.)

The outlook everywhere in a mining sense is bright. As I have said, Capital is looking to British Columbia for investment. This is strikingly shown by the number of properties which have changed hands in the Kootenays, as well as the dealing which has been going on at Coast points. The industry generally appears to be in a very healthy condition. It remains for those directly interested to pursue their work energetically and along legitimate lines. The country possesses the natural wealth. It is the duty of the people to develop it in such a way as to contribute to the commerce and industry of the Northwest. If this policy is followed the confidence of those looking for profitable mediums of investment will be maintained and there will be no difficulty in obtaining capital.

Increase in Value of Mineral Output of Province.

Last year, when the mining industry did not flourish as it had done generally, British Columbia's mineral output in value was $41,083,093, an increase over 1917 of $4,072,701, or 11 per cent. This is particularly gratifying when it is remembered that decreases were reported from the States of Utah, Nevada, Idaho, Colorado and California. It was not the time, however, to look back upon the past. Mining men should look forward. Not only is metal mining in the happy position of an assured future, but the gold producing districts of the Province having been mentioned, I want to say that it is significant that there have been of late many applications at the Department of Mines for placer dredging leases. There is no doubt that there is to be revival of this form of mining on the placer grounds of the Cariboo and other northern sections of the Province.

Mining Flotations Must Be Legitimate.

But it is essential that we as mining men should beware of the "wild catter." Under the Mineral & Survey Act I have authority to check such propositions as may seem, on investigation, to be of such a character. I may say that there is no objection to a company with a prospect issuing a prospectus which paints in fairly rosy colors the future of that prospect. But it is our determination that money obtained by the sale of stock shall be spent in the development of the propery in question. It must be recognized that capital is needed at the beginning of the opening of every prospect and that those most promising not infrequently turn out differently on development. The biggest propositions must have a start, but those who put their money into them at the beginning must have fair treatment. Briefly it should be the duty of us all, in the interests of the public, to see that the mineral and not the public is mined.

Revival of Local Treatment as Regards Flotation by Dean Francis A. Thomson, of the College of Mines, Moscow, Idaho.

Dean Thomson stated that it was not his intention to hold very closely to the limits of the title inasmuch as it was his desire merely to touch, generally, on the development of the smelter and the rapid improvements being introduced constantly through advances in metallurgical methods.

It was not many years ago when throughout all the mining States and in British Columbia there were numerous little smelters. They had been dotted all over the landscape and their remains still were to be seen, a somewhat dismal reminder of the past. It had been discovered through experience that it did not pay for a single mine, small in its output, to attempt to maintain a smelter. This experience resulted in a combination of properties for the maintenance of the smelters to handle their joint production. The change was found to work admirably. The method then was carried further and we have the present conditions of very large smelting plants handling the product of considerable mining districts.

Revival of Small Individual Treating Plants at Mine Site.

It was Dean Thomson's opinion that another step in the process of evolution was about due, and in this connection he referred to the very rapid development, and to the wonderful achievements of hydro-metallurgical methods. He spoke of some of the things that already have been done along this line with particular reference to silver, lead and zinc and expressed the opinion that all this was but the beginning, and that some remarkable advances were probable in the not distant future. The time was coming when we would lose the period of consolidation in regard to smelting, and go back, in a measure, to the small installation at the mine. His theory was that the ore would receive treatment at the mine metallurgically, after which it would be shipped to the smelter for refinement. He did not want it to oe taken that he held the opinion that the day of the smel-

ter was drawing to a close. That was far from his view of what the future holds in store. But he did want to make it clear that successful metallurgical experimentation was bringing about important changes in the method of treating ore particularly the peculiarly complex ores such as are found in the Kootenay and Boundary Districts of British Columbia.

Dr. Hodge Speaks on the Iron & Steel Industry of B.C.

Chairman Thompson called on Dr. E. T. Hodge, Professor of Geology, University of British Columbia, who took for his subject the iron and steel industry in British Columbia. He said that as it was admitted, apparently, that nothing could be of more benefit to the Pacific Northwest than the development of its magetite deposits. It was strange that some action had not yet been taken. The natural resources were available. There had been considerable discussion as to the quality of the ore as well as in regard to its quantity. As to the latter point there was no doubt that there was sufficient available to supply a fairly good sized plant for fifty years. In regard to the matter of quality the ores of British Columbia were magnetite for the most part. Of these deposits there were many. It was possible that some of the magnetites of the Northwest would be difficult to handle because of their copper contents, but this was no longer a serious problem, inasmuch as it has been proved that copper was not a detriment to steel. There was no doubt however, that for the most part the British Columbia iron ores were exceptionally pure, and the only question of a serious nature that he could see was whether it was more desirable to adopt the electric smelter or abide by the old blast-furnace practice. For his part he was of the opinion that the blast-furnace was of the most service in an industrial way and that electric smelting as a main factor in a large iron and steel industry was not yet established.

It having been established that the ores available of the required purity, it was well to glance at other features in the consideration of such an enterprise. Plenty of good metallurgical coke could be secured. It was said that the coal of Vancouver Island was not desirable, but he doubted this. Vancouver Island coal has been subjected to some experiments and he did not think that it could be definitely said that it was not good coking coal. Certainly, however, the coal of the Nicola Coalmont-Princeton Valley was a fine metallurgical coal. In fact, there could be none better. Coal dust, too, had been used to advantage in the blast furnace, so that there did not seem to be any cause for doubt in respect of fuel.

There was lots of flux. Many belts of first class limestone existed in British Colmbia. There was fluorite, a large deposit of which has just been opened by the Canadian Consolidated, and there were refractories. Everyone had heard of the magnesite of the State of Washington, which unfortunately now appeared to be inactive owing to the European situation. There also were good deposits of a similar nature in British Columbia. He knew of one in the Cariboo District a short distance from tidewater. Chrome, too, was found in this Province, there being deposits at Cascade and on Scotty Creek. Manganese had been found close to Kaslo and on Vancouver Island. It, therefore, would appear that those minerals necessary for purification purposes were present in the Northwest in ample quantities. It was apparent from what he had outlined that there could be produced without difficulty such alloys as Ferro-Chromite, Ferro-Magnesite, Ferro-Silicon, and Ferro-Tungsten. In regard to the latter, Dr. Hodge said that he had knowledge of deposits of scheelite in the Cariboo District.

In short, the speaker declared that it was his opinion that the time for talk had passed and that for action had come. A plant should be established, he said, of from 200 to 300 tons per day capacity. Perhaps there might be some difficulty as to labour but Pittsburgh had started without trained men and had succeeded. There were a great many mechanics employed in the shipyards and it was possible that some of these might be available. In regard to the market he did not think that there would be any difficulty in finding or developing enough to take care of the production of such a plant as he had in mind. For instance there is an exceedingly large tonnage of sheet iron used for canning purposes in the Pacific Northwest. Moreover, too little attention was given to the possibilities of the Oriental trade, from what he had been able to gather, the accounts commonly heard of the extent of the Chinese iron deposits were exaggerated. It seemed to him that the Pacific Coast had an opportunity of developing a large trade intercourse with the Orient.

Desirability of Bonusing Steel Manufacture Urged.

If the possibilities were as stated how was it that no company had as yet embarked in the industry? The explanation, Dr. Hodge thought, lay in the very large amount of capital which would have to be invested and the fact that it would take a rather lengthy period before the industry was established on a paying basis. An iron and steel industry, he declared, should be treated by the Government in the same way as a railway. Railways were bonused or subsidized by the Government because they had the effect of opening new country, bringing about development, and materially aiding the advancement of an unexplored country. Why not apply the same principle to a steel industry? It was in much the same position. Much capital was required to start it and some years would have to be spent in putting it on its feet but, when it was established, the result in the employment of men, in the initiation of subsidiary industries, and in the general welfare of the country was inestimable. He believed, for these reasons, that the British Columbia or the Dominion Governments, or both, should subsidize the industry in this Province, just as they had done various railways. What had been done in the way of bonuses, etc., did not go far enough. If there was further delay others would seize the opportunity which, there was no doubt, was available at the present moment. (Applause.)

Some discussion followed. Mr. Armstrong, of Spokane, thought that there was an important future for electro smelting in British Columbia and Washington, because of the variety of the rarer alloys which they had been found to possess. Mr. Thompson, of Vancouver, emphasized the purity of the magnetites of British Columbia which were low in sulphur and without copper for the most part. As to magnesite, he said that Dr. Hodge had neglected to refer to the very large deposit of it at Atlin, B.C. He was sure that there were 1,000,000 tons of first-class hydro-magnesite lying on the surface a short distance from the town of Atlin. Rock Magnesite also occurred in that section. Mr. Thomson spoke of the bounties which had been offered by the British Columbia Government on pig-iron produced locally and to the efforts which had been made to induce the Dominion Government to do something to assist those who might contemplate launching an iron and steel industry.

"Platinum and Other Minerals Found in the Ultra-Basic Rocks," by William Tomlinson, E.M. New Denver.

Mr. Tomlinson on the staff of the Munition Resources Commission in Canada during the war, directed his talk to the prospectors entirely. He spoke of the peculiarities of chromite, molybdenite, tungsten, platinum and others of the rarer metals. There were deposits, or indications of all those named, as well as of others, in British Columbia. The trouble, he stated, was that the average prospector did not recognize them when he saw them. It was more than likely that he would walk right over chromite, for instance, and systematic education of the prospectors was required. Mr. Tomlinson recounted his experiences in the Franklin Camp and the finding there of platinum in place. Mr. Tomlinson concluded with a very strong plea for government assistance on behalf of the prospector. This duty had been neglected in the Northwest to such an extent that there were few men, comparatively speaking, going into the hills. In California alone had he found the educated prospector. The men he had seen there were hard to deceive when it came to the appraisement of mineral. There was no reason why such a condition should not be developed in B.C. and he recommended that mining schools should be opened in the different mineral districts during the winter months. This would enable men to employ their idle time in acquiring knowledge and fitting them for the summer's work. He also expressed the hope that all the District Mining Engineers would place exhibits of the rarer minerals at their headquarters for the benefit of prospctors and others.

"Straight Talk" From a Veteran.

J. J. Mulholland, a pioneer prospector, gave what was entitled a "straight talk." He briefly outlined his experiences in the wilds of the Northwest and referred to the future of the great unexplored northwest section of the province in a mining sense as being full of promise. He thought it likely that there would be found another Klondyke somewhere along the great rivers of the Peace River and adjacent districts. It was his intention, in fact, he already had completed plans, to conduct an expedition into the Mackenzie River Country. Of course, the great difficulty, even if a strike were made, was that of transportation.

During the last few years there had been comparatively little prospecting and the reason was hard to find. It was true that the prospectors were given little encouragement. In the old days it was not hard to obtain a grub-stake, but now if a miner asked a merchant for one it was likely that the latter would express doubts of his sanity. The construction of trunk trails into the unexpected areas he thought was a desirable move, because there was no doubt that it was extremely hard to travel through the heavily wooded and mountainous frontiers of this province. The teaching of mineralogy and geology in the public schools would help and he thought that each Mineral Survey District should be provided with a map showing its topographical peculiarities and the mineralized zones.

Illustrating the results of prospectors working in the darkness of ignorance he said that 30 odd pounds of high grade tin ore had been found in a prospector's shack in Northern British Columbia. This prospector had had the ore assayed for gold and silver and, having got an unsatisfactory return, paid no more attention to it. Subsequently this man had died in the Yukon. Efforts had been made to find the deposit from which these samples came without success up to the present.

Prospectors, should be able to get reports on their prospects from the Government Mining Engineers; they should have assaying done free of charge; and should have the benefit of winter schools. He also advocated that the price of powder to miners be reduced and that the duty should be taken off mill machinery, inasmuch as the greater part of this was imported from the United States.

Summary Review of Mining and the Distribution of Minerals in the Kootenays.

Mr. A. G. Langley, District Engineer for Mineral Survey District No. 5 pointed out that his District was responsible for the entire Lead-Zinc production of Canada and was second only to the Cobalt in silver output. The principal methods mined, taken in the order of the value of production, were: lead, zinc, silver, gold and copper.

Referring to the importance of Rossland as a gold camp Mr. Langley said that the Consolidated Mining & Smelting Company had recently curtailed the production of their properties pending the installation of a concentrator to treat the low grade sulphides. When this was completed a considerable increase in output was contemplated.

Discussing the Yankee Girl at Ymir Camp it is pointed out that this property has been a substantial producer of gold in the past, that in 1918 about 8,000 tons of ore were shipped to the Greenwood Smelter, from which very favorable rates were obtained "due to the fact that the ore was suitable for mixing with those of the Boundary District." Shipments, he stated, had been suspended in December of 1918, "but there is reported to be a considerable tonnage of milling ore available, and judging from reports it is a property well worthy of further investigation with a view to installing a concentrator to treat the low grade sulphides. The principal values are in gold and silver."

In the Central Mineral Belt of the Trout lake Mining Division, extending from Camborne to Poplar Creek, numerous prospects have been located.

Near Cambourne the Eva and Oyster Criterion, which are both equipped with ten stamp mills, have had a considerable amount of development work done on them, and there is said to be a large tonnage of low grade ore available. Numerous other properties in this vicinity have been prospected. Among others the Burniere Group at the head of Scott Creek is said to have a good showing."

Discussing the copper production Mr. Langley dealt with the Rossland Camp; the Mountain Chief Mine at Ranata on Arrow Lake, recently come into prominence; the California Mine near Nelson, which had leased the Athabasca Mill and was likely soon to be on a producing basis; and to the Trojan Mine, on Boulder Creek, Windermere District, the management of which were contemplating the erection of a small concentrator. He spoke also of the Eureka Mine, where a considerable body of low grade ore has been encountered in the southern end of the main workings, and stated that the management had leased the Granite Poorman Mill, and installed a Zeigler Flotation Machine. The values of the Eureka, which is situated close to Nelson, are in copper, silver, and gold.

Dealing with Lead-Silver-Zinc, and Lead-Silver-Zinc Gold--Zinc Ores, Mr. Langley said, in regard to the former, that the Kootenays produced more of this

class than any other section. The Slocan Division was first in silver production by a wide margin which the Fort Steel Division was in the van in respect of lead and zinc output.

Reference was made to the Noble Five Mine near Sandon, where the big raise connecting the lower workings with the upper is completed and a 100 Ton Concentrator is being constructed by the General Engineering Company of Salt Lake City. The flow sheet, it was explained, embodies a system of jigs, Whilfley tables, and Callow Flotation Cells. The Surprise Mining Company, the Queen Bess Mine, the Silversmith Mines, and the Rambler-Cariboo Mine were mentioned by Mr. Langley as being either producers or prospective producers in the Sandon District. In connection with the latter properties the 150 Ton Concentrator, being constructed at Alamo, B.C., for Clarence Cunningham, was described. In a recent interview it is stated that Mr. Cunningham expressed his readiness to treat custom ores and it was thought that this would be a help to the small operators of the ditsrict.

In conclusion Mr. Langley said:

"In concentrating the silver-lead-zinc ores from the Slocan and other parts of the District, a fairly high percentage of the silver values is contained in the zinc concentrates, and a solution of the problem of separating the silver from the zinc would be of immense value to the mines of the district.

"Besides the ores already dealt with there are known deposits of molybdenite, chromite, hematite, bismuth, magnetite, and manganese, but none of these is being mined at present."

The Mineralization of Northern Manitoba, by R. C. Wallace, The Pas, Manitoba.

This paper, which was read by proxy, stated that the areas of which something had been learned of late extended northward about 200 miles and was of varying width, averaging about 20 miles. It was some 186 miles distant from The Pas and could be divided into two zones, the Western and the Eastern. The former had been found to be rich in high grade copper and in the latter had been discovered gold. Of the copper properties developed the chief were the Mandy and the Flin Flon, which were copper sulphide ore bodies. They had been discovered in the Fall of 1915 near the boundary of the Provinces of Saskatchewan and Manitoba. The Mandy had been taken over by the Tonapah Mining Company and a subsidiary operating company formed known as the Mandy Mining Company. Ore had been taken from a very high grade lens of Chalcopyrite and hauled 40 miles by wagon, 130 miles by barge to The Pas, and freighted 1,200 miles by railway to Trail Smeltery. Altogether 25,000 tons had been produced, of which half had reached the Smelter, which averaged in its copper content between seventeen and eighteen per cent., with some values in gold and silver. Despite the high transportation expenses a profit had been shown on the ore shipped. On the Flin Flon, during the year 1916-17- and 18, development had proceeded by means of the diamond drill, as a result of which an ore body had been blocked out to a depth of 900 feet. The work done had demonstrated that it was one of the large low-grade copper-sulphide bodies of the Dominion, there being sixteen million tons blocked out to the depth stated averaging eight dollars per ton at present prices. The ore also contained gold and silver values. A smelter would have to be built and a water power developed which was 35 miles distant from the deposit. There was a railway for a distance of 85 miles from The Pas and the Canadian National Ry. will guarantee the provision of transportation facilities providing funds were available to install the 2,000 ton smelter necessary and to undertake to operate it to capacity. In this connection the writer stated that there was a fuel problem because of the high price of coke, but powdered coal might be utilized. He thought that electric smelting might be tried.

Referring to the gold discoveries of the eastern section of the area under discussion the first indications were found on Herb and Wekusko Lakes. Since then prospectors had been active. The Rex Property had been recorded by the Makeever Bros. on which a 40 Ton Lane Mill had been installed in 1918. Between May, 1918, and early inthe following December, when the Mill closed because of labor troubles, approximately $27,000 had been obtained in values from the plates. Work thus far had been confined to the first level and the vein was between 4 and 4½ feet in width.

Closing Resolutions.

The Convention closed with the discussion and passage of a number of resolutions.

Returned Soldiers' Prospecting Parties.

The first was that proposed by the Canadian Mining Institute, embodying a scheme whereby returned soldiers, with the necessary qualifications, may be given an oportunity to prospect for minerals in Canada. The idea is that capable returned men, wanting this kind of work, shall be divided into small parties, each of which shall be in charge of an engineer. These parties, it is explained, would be re-grouped and the latter group placed under the supervision of a divisional engineer. The whole, in turn, would be under a Chief Engineer. Each group would be placed in specified parts of the mineralized zones of Canada, and each man would be paid a small salary, and, of course, maintained. The Dominion Government is to be asked to provide $200,000 to permit 200 returned men to be sent into the field in the manner outlined. It is understood that discoveries by these prospectors would be developed when thought of merit by experts, and their value, when realized, divided in proportions to be decided upon between the discoverers and the Government, the latter having this means of recouping itself in a measure. The proposal was endorsed.

Government Asked to Purchase and Distribute Powder.

A resolution was passed asking the Provincial Government to arrange for the purchase of powder in large quantities for use in each mineral district, and for its distribution through a Government Agency in smal quantities and at minimum charges to prospectors and operators.

Resolutions were also passed asking the Provincial Government to appoint more District Mining Engineers where needed, and petitioning the Dominion Government to intervene for the settlement of the coal miners' strike in the Crows Nest Pass District, inasmuch as the shortage of coke was adversely affecting the metaliferous industry of the Province.

The British Columbia and the Dominion Governments were also urged to provide subsidies to encourage the establishment of a blast furnace of 300 ton daily capacity at some point in the Province on the Pacific Coast.

Special Correspondence

BRITISH COLUMBIA.

Changes in Examination Boards for Miners Certificates.

In accordance with amendments to the Coal Mines Regulation Act enacted at the last session of the Provincial Legislature, the system of examining officials and men employed in and around the coal mines of the Province as to their competency to hold positions of responsibility will be radically changed from the 1st of July next. For some time Mr. Sloan has been engaged in perfecting the organization which is to supplant that of the past, and today he stated that all arrangements were complete and that everything was in shape to launch the new and less cumbersome method of holding examinations and issuing certificates of competency.

Henry Riard, of Coal Creek, B.C., and James Dixon, of Nanaimo, B.C., are the examiners appointed. Both are well and favorably known among all associated with the coal mining industry in the Province. Mr. Miard has been a resident of Canada for over 20 years, and since 1911 has been the miner's representative on the retiring Board of Examiners. For nearly 20 years he has worked in the coal mines of the Crow's Nest Pass Field, and at the time of the outbreak of the war was employed as Overman at No. 3 Mine, Coal Creek Colliery. No sooner did hostilities break out than he was on his way to Europe, reaching the front in the early stages of the great war, and was in the defensive battles at Verdun. Finally he was taken prisoner and held for 27 months in South Westphalia, where he served as interpreter, bookkeeper, timekeeper and in other capacities in a pyrities and barytes mines. He returned to British Columbia about a month ago and is the holder of a First-Class Certificate of Competency in this Province. James Dixon is mine manager at the Reserve Mine operated by the Western Fuel Company, Nanaimo. For several years Mr. Dixon held important official positions in Great Britain. He has been appraiser for the Board of Examiners of B.C., examining the papers of candidates for Certificates of Competency, and both by training and experience is highly qualified for the duties of his new office. He was a teacher in connection with the Technical Mining Classes conducted at Nanaimo and is the holder of a First-Class Certificate of Competency for British Columbia and Great Britain.

Mr. Sloan feels that he is fortunate in being able to obtain two men, so well qualified in every way, to handle the work of examining officials and men wishing to qualify for employment in the coal mines of the Province. He wishes also to make clear a point, in connection with the new system, over which there appears to be some misunderstanding. These two appointments are all that are required for the operation of the change provided for by the amendments to the Coal Mines Regulation Act of last session. Messrs. Miard and Dixon will act in a dual capacity. Firstly they are members, with the Chief Inspector of Mines as chairman, of the Board of Examiners charged with the examination of candidates for Certificates of Competency as coal mine officials. Secondly, they are members, with the Inspectors of Mines of the various districts as chairmen—the personnel of the chairman depending on the particular district in which the examination happens to be in progress—of the Board for the examination of candidates for certificates of competency as coal miners. Thus, Mr. Sloan explains, there is really only one Board, supplemented in the manner indicated by permanent officials of the Inspection Staff of the Department of Mines. This Central Board supersedes the top-heavy machinery which has existed consisting of a Mine officials' Board of six members and nine Miners' Board of three members each, and it permits the reduction of the personnel of the Examining Administration from 33 to 3, enabling the Government to dispense with the services of 27 officials, and at the same time gain increased efficiency.

The formation of this Central Board will remove the difficulties encountered in the satisfactory maintenance of nine Board of Examiners for the examination of coal miners and one Board for the examination of Coal Mine Officials. At present the latter Board consists of three coal mine managers, and three representatives of the men from different parts of the Province, together with the Chief Inspector of Mines. Its headquarters are in Nanaimo, B.C. Two of the men's representatives are of the Crow's Nest Pass Coal Field and, in the course of the past five years only on one occasion has one of these representatives been able to attend a Board meeting. While provision was made to pay the travelling expenses of those coming from a distance, this reimbursement by no means covered the loss of time which trips from various parts of the Province to the Coast entailed. The result was that the Board often found it difficult to obtain a quorum. Its duties, too, have been merely of a supervisory character in connection with examinations. It called a meeting, set a date for examinations, appointed outside parties who had to be paid very highly for their services, to prepare examination papers and examine the answers of candidates. The Board then forwarded the results to the Minister of Mines. Mr. Sloan, when considering reorganization, felt that much of this procedure was useless, besides having the effect of leaving functions of vital importance in the hands of a few, it being impossible in many instances, as has been shown, for the men's representatives to be in attendance at regularly called meetings. Under the new arrangement the two examiners just appointed, with the Chief Inspector of Mines as their chairman, will conduct examinations of candidates for Certificates of Competency as officials in coal mines, wherever it may be most convenient to all concerned.

As stated there now are nine Boards of Examiners for the conduct of examination of candidates wishing Certificates of Competency as coal miners. If the old system were to be continued it would be necessary to augment this number by at least five more and, as the extent of coal mining in the province widened, it would be essential to continue adding to the Boards ad infinitum. This point is illustrated by the present situation. Under the unamended Coal Mines Regulation Act most of the collieries had their own Boards for the examination of men, the membership of which consisted of a secretary appointed by Lieut.-Governor-in-Council, a representative of the mine management, and another of the men. This arrangement, no doubt, was satisfactory so long as there were only a few operating mines in the province. Conditions, however, are changed. There now are a considerable number of small collieries and, if each of these were given a Board, to which they were

entitled under the Act as it stood originally, there might be almost as many members of examining Boards as there are miners coming up for examination monthly.

These problems will be completely met by the new Central Board. Instead of the men going to the Board, the Board will go to them. It will visit each coal mining district at regular intervals, the two permanent examiners just appointed being joined in each district by the Ispector of Mines of that District and conducting examinations for the benefit of miners wishing to secure the Certificates of Competency necessary to permit them to go to work as coal miners. Besides the obvious benefit that this will be to the candidate, both in respect of expense and loss of time, it will have the effect of setting a standard of knowledge among all underground workers in coal throughout the province, making it impossible, as sometimes now happens, for a man to fail before one Board and immediately after successfully passing another Board in an adjacent district. It will obviate the present difficulty of too much Board representation at one point and too little at another. Another important point—and this will be the deathblow to the practice sometimes countenanced in the past of permitting aliens to obtain employment in the coal mines of the province—is that no man will be admitted to a mine to work as a coal miner for a temporary period pending his examination. This has been allowed heretofore. Hereafter, however, if a man applies for work as a miner, and an immediate examination is impracticable, he must go before the Inspector of Mines for the district who, having satisfied himself of the man's qualifications, will issue him a temporary certificate. In such cases those affected must go before the regularly constituted Board at the first opportunity.

In this connection Mr. Sloan maintains that it is a manifest absurdity to allow an uncertificated man to assume the responsibilities of a miner for thirty days without his knowledge being tested, it being possible for an incompetent person in that period to endanger, not only his own life, but that of hundreds of others. He points out, too, as indicated, that the necessity of a candidate going before an Inspector of Mines to secure a temporary certificate will provide the means of much more adequate control than at present over those given underground employment, and he feels it will restrict the employment of aliens underground as miners in British Columbia.

Mr. Donald McLean, manager of the Coalmont (B.C.) Collieries, has been appointed Inspector of Mines for the Merritt District, according to an announcement made to-day (June 28) by Hon. Wm. Sloan, Minister of Mines.

This vacancy was created through the transfer of Inspector Andrew Strachan from Merritt to Fernie on the retirement of former Inspector T. H. Williams from the Crow's Nest Pass District.

The new Inspector of Mines, Mr. McLean, returned from service overseas about 18 months ago. He enlisted in the early part of the war and was through a considerable of the first military operations on the western front. Finally he was wounded and invalided home.

Mr. McLean has high qualifications for the discharge of the duties of the post to which he has been appointed. He is the holder of a First Class Certificate of Competency for British Columbia and Alberta and, since his return from Europe, has been manager of the Coalmont Colliery. He also has had a varied and lengthy experience in other coal mines of the province, for many years being employed as overman at the Extension Colliery, and later teaching at the Mining School at Ladysmith.

NORTHERN ONTARIO.

"Post-Mortem" on Nipissing Not Necessary — Our Correspondent Reveals Inaccuracy of Deductions in Toronto "Saturday Night" Article.

In an article written by Carpel L. Berger, in the Financial World," New York, and reproduced in the "Saturday Night," Toronto, on June 21st, appear a number of startling deductions and prophesies with regard to the Nipissing Mines, of Cobalt. The article is one of the most pessimistic written in recent years in connection with the silver mines of Cobalt, and would be alarming to shareholders of some of the mining companies operating in the district, but for the undeniable fact that the article from beginning to end is founded chiefly on inaccuracies, and is but another demonstration of how impossible it is, and how pitiful is the attempt of any man to deal with a subject about which he has but very little information. The article does not even show ability to properly analyse a mining report.

For instance, it is stated that "Only 33 ounces per ton was the average recovery in the first 4 months of 1919 from combined high-grade washing ores and low-grade cyanide milling ores." How the writer arrived at these figures is difficult to understand, as the official average has ranged from 40 to 45 ounces. It is quite possible the 33 ounce average was reached by dividing the number of ounces produced by the Nipissing by the amount of ore treated in the mill. Mr. Breger apparently divided the Nipissing bullion production by not only Nipissing ore, but also including the customs-ore from other mines which was treated in the Nipissing mill. So much for the incorrect statement in connection with the average grade of the ore.

The writer continues: "In the early months of 1919, the yield of high grade washing ores dropped to only 700 ounces per ton, and when it dropped to 450 ounces per ton in April, the high grade mill was closed down, signifying the exhaustion of large bodies of high-grade ore. Henceforth the high-grade, such as may remain or be found, will probably be mixed with and handled as part of the feed of the low-grade mill." This statement is incorrect in every particular. First, it is a fact that the high grade ore treated so far this year has averaged from 1,400 to 1,600 ounces per ton, and for the first six months of 1919 has exceeded the average of 1918. Second, the high-grade ore *is not* being mixed with and handled as a part of the feed for the low-grade mill. The fact is that owing to the war having caused the quotations for mercury to increase from a minimum $33 per flask of 75 pounds, to a maximum of $130 per flask, it was decided to discontinue the amalgamation process, but arrangements were made to treat the high-grade by cyanidation, after giving the ore a preliminary treatment with bleaching powder in the tube mill. Accordingly, the necessary apparatus for the process was installed under the same roof as the equipment for treating low-grade ore. This is why the New York critic becomes erroneously obsessed with the idea that the Nipissing had exhausted its high grade ore! Furthermore, the change was not made in April, as Mr. Berger states. The change was made in August, 1918,

and is so stated in the last annual report of the Nipissing Mining Company.

It is one of the ironies of fate that when Mr. Berger was writing his article, pointing out that during the first four months of 1919 the Nipissing produced $952,-197, or an average of about $238,049 monthly, the company was setting a new high record by producing $347,-751 in May, one of the highest month's output in the history of any silver producing mine in the British Empire. Also, for the first half of the current year the output has amounted to upwards of $1,600,000, or at the rate of upwards of $3,200,000 annually, as compared with Mr. Berger's guess of about two and a half million ounces, which at the present high quotation for silver would be approximately half a million dollars less than that actually indicated. Indeed with the exception of 1918, the production from the Nipissing during 1919 will probably have a greater value than any previous year in the company's history. This fact is clearly shown in the following summary of production since the mine was first opened, and also showing the dividends paid from year to year, with 1918 and 1919 in point of dividends paid, equal to the company's best years, with the exception of 1910:

Year	Dividends Paid.	Value Produced.
1904	.....	$ 23,887.52
1905	.....	471,666.61
1906	$480,000	1,421,655.54
1907	840,000	1,234,492.35
1908	720,000	1,364,478.03
1909	1,350,000	2,180,407.02
1910	2,100,000	2,742,842.58
1911	1,800,000	2,381,712.54
1912	1,800,000	2,827,317.62
1913	1,800,000	2,920,714.26
1914	1,350,000	2,207,427.72
1915	1,200,000	2,383,877.91
1916	1,500,000	2,687,530.85
1917	1,800,000	3,239,151.62
1918	1,800,000	4,166,064.27
1919	1,800,000	3,250,000.00
Totals	$20,940,000	$35,503,226.44

A study of the above figures reveals the interesting fact that approximately 59 per cent of the entire production has been paid in dividends.

It might be interesting to state that during the first five months of 1919 the Nipissing produced $1,299,-948, on which a "net" profit of $800,000 was realized This reveals the very significant fact that current profits amount to approximately 61 per cent of the total output, as compared with an average of 59 per cent since the mine was first opened up. These figures are not prophecy, or expectations, but are facts. Figures, fortunately, do not lie, no matter to what severe tests they may be put. To the 59 per cent, of course, must be added the present treasury surplus; yet, after adding this, it is still evident that the Nipissing is maintaining its earning power on a par with its best days.

Pessimists sometimes point toward the Nipissing's ore reserves of 6,000,000 ounces as of the beginning of the current year. They did the same many years ago. As fr back as 1915 the general manager, R. B. Watson, apparently had this in mind when he opened the concluding paragraph of his annual statement with the remark, "The Nipissing Mine has never shown ore reserves commensurate with its annual output, but the history of the company during the past twelve years has shown that the development of new ores has kept pace with the current production."

To the foregoing, the year 1919 promises to be no exception, in that already a large amount of new high-grade ore has been developed this year. As to what the future will bring, it would be folly to hazard a guess. However, that the Nipissing, with quotations for silver at or above $1 per ounce, will enjoy prosperity for a good many years seems certain. The Nipissing, like every other mine discovered, must some day end its profitable career. Every dollar taken out leaves that much less in any mine. This fact is obvious to all. Nevertheless only unrelieved pessimism can explain the spectacle of a careless critic holding a postmortem over a world-famous mine just at the moment when that particular mine is enjoying the acme of prosperity.

Increased Price of Silver Brings Bonus to Cobalt Miners.

During the month of June, the quotations for commercial bar silver, as submitted by Handy and Harman, of New York, showed an average of a fraction of a cent above the $1.10 mark, and it is understood the majority of the mines of Cobalt have decided to pay their employees an additional bonus of 25 cents per day. This increases the bonus to $1.50 daily above the regular rage.

The bonus, or profit-sharing plan, was adopted in 1917, and is based upon the quotations for silver, a bonus of 25 cents a day to be paid when silver averages 60 cents or over for the month, and an additional 25 cents a day for each ten points above 60 cents. Although there has apparently been no promise made to the men that this system would continue beyond that of $1.25 per day paid on $1 silver, yet the high cost of living has been taken into account by the mining companies, with the result as above stated that a bonus of $1.50 a day will be paid by the majority of the mines on silver at $1.10 cents an ounce or over.

The additional bonus during June will add about $600 every 24 hours to the men engaged in mining at Cobalt. There are upwards of 2,300 men engaged, and allowing a 26-day working month, the monthly pay-roll will be increased approximately $15,600, or at the rate of about $187,200 annualy, provided it should continue that long.

Kirkland Lake District.

Following the successful development of the Ontario-Kirkland Mine, formerly the Hurd property, arrangements have been made to instal a mill at an early date. The plant will have a capacity for treating 100 tons daily, and will be installed with the least possible delay, the contract having already been let, according to official advice just to hand.

During the present lull in operations, caused by the labor strike, the macadam road from Swastika to Kirkland Lake is being built, under the direction of the Ontario Government. With this road completed this year, the transportation of heavy machinery will be made less difficult.

At the 300-ft. level of the Ontario-Kirkland, two veins have been opened up in one of which $28 ore is showing in the west drift across a width of about five feet. This was at first thought to be vein No. 1, but in working out the fault problem was found to be No. 2 vein. Accordingly, a cross-cut is being driven north to tap the No. 1 vein. About 30 feet remains between the present face of the cross-cut and the point where No. 1 vein is expected to be encountered.

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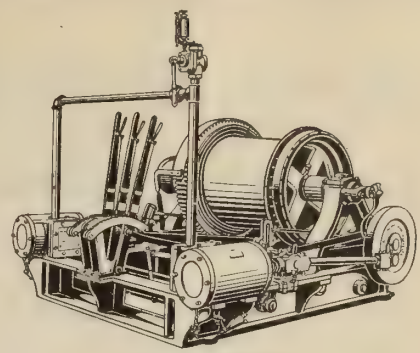
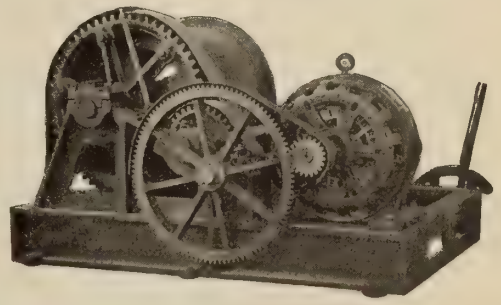


STEAM POWER



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Plans are under way to carry out an aggressive exploration programme on the property of the Greene-Kirkland Company, at Kirkland Lake, toward which end a small mining plant is to be installed.

The property consists of a group of claims formerly owned by the Lucky Cross Mining Company. Part of the Lucky Cross property was sold last winter to the Marigold Mining Company, the remainder going to the Greene-Kirkland. The latter company is practically a closed corporation, and is being financed largely by interests in Chicago.

Boston Creek Not Involved in Strike.

At Boston Creek a peculiar situation has arisen in connection with the labor strike. It is now understood that although the men at the Miller-Independence went out on strike at the same time that the Kirkland Lake strike was called, they had not been told to do so by the officials of the organization to which some of them belong.

About a week or ten days ago a labor delegation of three from Kirkland Lake called at the Miller-Independence, and stated that no strike had been called. As a consequence, therefore, there would appear to be nothing in the way to prevent the resumption of work under the old conditions at any time the Miller-Independence so desires.

As this was the only property in the camp where the men quit work, the Boston Creek camp may now be said to not be involved in any way in the labor strike.

Another shoot of high grade ore is stated to have been opened up at a depth of about 575 feet on the Temiskaming Mine. Until further work is done it will not be possible to estimate whether or not the find is important.

WILL DEVELOP HERB LAKE PROPERTIES.

The Pas, Man.—Having been relieved of the financial burden of carrying on its Mexican properties, Messrs. Makeever Brothers, of New York, owners of the Rex at Herb lake, feel they are now in a position to open up the property. They are planning, it is stated, to go ahead upon a large scale sometime in August.—The Pas Herald.

Of this property Dr. R. C. Wallace, Mining Commisisoner of Northern Manitoba reported in March as follows: One property—the Rex—has reached the producing stage. The Makeever Brothers have erected a 40-ton Lane mill, with amalgamation plates and two Deister Overstrom tables, a 55-h.p. engine, two 60 h.p. boilers and 390 cu. ft. air compressor. The mill was in operation from May 1st to December 1st, 1918, when adverse labor conditions, accentuated by the influenza epidemic, necessitated its closing for the winter. Approximately $27,000 of gold were obtained from the plates during the time of operation, representing the first regular output of gold from any mine in Manitoba. The amount of underground work is relatively small, and is confined to stoping from the drift on the 100-ft. level, and it was possible to employ a single shaft only to operate the mill. The vein is exposed for 1,700 feet, and has an average width in the shaft and drift of probably 4½ feet. The values throughout this width range from $110 to $6, with an average of over $20. Sulphides are unimportant except on the walls. The concentrates from the table are stored for extraction when a cyanide plant shall have been added to the mill equipment. It is planned, upon the resumption of operations in the fall, to pursue much more extensive underground developments, in order that the mill may be operated on a continuous basis.

IN THE MATTER OF

The German Development Company, Limited

SEALED TENDERS will be received addressed to **G. T. Clarkson, 15 Wellington Street West, Toronto,** and marked "Tenders re German Development Company, Limited," up to Twelve o'clock noon of **Wednesday, July 16th, 1919,** for the purchase of the following assets of the German Development Company, Limited, namely:

Parcel No. 1.—68,000 shares, of a par value of $1.00 each, of the Capital Stock of the Miller Lake and Everett Mines, Limited, the owner of certain mining claims in the Miller Lake District in Northern Ontario.

Parcel No. 2.—Mining Claim being the S.E. ¼ of the N. ½ of Lot 9 in the 5th Concession in the Township of James, Timagami Forest Reserve, containing 39-⅝ acres, more or less, covered by Mining Lease No. 3818, from the Province of Ontario.

Parcel No. 3.—Mining Claims T. C. 453, 454, 455, 456, and 457, and M.E. 723, 522 and 523, and G.G. in the Township of Halton, District of Nipissing, containing 157 2-5 acres, more or less, covered by Mining Lease No. 3875, from the Province of Ontario.

Parcel No. 4.—Mining Claim being the N.E. ¼ of the N. ½ of Lot 12, in the 4th Concession in the Township of James, District of Nipissing, containing 4¾ acres, more or less, covered by Mining Lease No. 3878, from the Province of Ontario.

Tenders for Parcel No. 1 must be at a rate per share for the shares offered, and the tenderers must agree to purchase any lesser number of shares than 68,000, but not less than 25,000, if the undersigned shall so require.

As to Parcels Nos. 2, 3 and 4, the purchasers shall search the title at their own expense, and purchasers shall have ten days in which to make any objection or requisition as to title. In case any purchaser shall within such time make any objection or requisition which the undersigned shall be unable or unwilling to remove or answer the undersigned shall be at liberty to rescind the sale, in which case the purchaser shall be entitled only to a return of the deposit money without interest, costs or compensation.

Terms of Sale:—25 per cent cash and the balance within thirty days.

Each purchaser at the time of sale must sign an agreement for the completion of the purchase.

Tenders will be opened at the office of the undersigned, 15 Wellington Street, West, Toronto, at Twelve o'clock noon of Thursday, July 17th, 1919, when all tenderers are requested to be present.

Tenders must be accompanied by a marked cheque payable to the undersigned for 10% of the amount of the tender, which will be returned if the tender be not accepted. The highest or any tender not necessarily accepted.

For further particulars and conditions of sale application may be made to the undersigned.

Dated at Toronto this 9th day of June, 1919.

G. T. CLARKSON,
Controller and Manager of
The German Development
Company Limited

COAL-LANDS IN SMOKY RIVER DISTRICT, ALBERTA.

Report of Special Committee of Senate discloses Irregularities in Leasing of Mining Rights, Which Are Cancelled.

The Special Committee appointed by the Senate to investigate charges of irregularity in the granting of leases in the Smoky River District has reported. The coal mining locations comprised 18,000 acres of land and were originally held by a German-American syndicate, including one Dr. Reinbold Hoppe, of Oakland, Calif. That syndicate had expended $200,000 in work on the property and had paid $115,000 in rentals at a dollar an acre a year, when the leases were cancelled by the Interior Department because of default in payment of rentals. The leases were cancelled on August 3rd, 1918, and by August 21st all the locations had been re-staked by eight prospectors, who secured leases and in January, 1919, assigned their rights to Messrs. Shillington and Barnard.

The investigation by the special committee was ordered as a result of suggestions made in the Senate by Senators Bostock and Bradbury. The committee in its finding expresses the opinion that S. J. Robbins, formerly assistant secretary to the Minister of the Interior, disclosed information in the possession of the Interior Department with respect to the cancellation of the Hoppe leases. The committee finds that Mr. Robbins and George Craig, a clerk in the department, who is related to Dr. Shillington, went to Edmonton immediately after the Hoppe leases were cancelled. From this the committee infers that Messrs. Robbins and Craig aided those who re-staked the locations and subsequently assigned their rights. The committee recommends that the Interior Department hereafter deal with coal locations as it does with timber limits, investigate them, fix up-set prices for leases. disclose the information to the public and call for tenders for the locations. The committee also suggests that legislation be enacted to make disclosure of confidential information by a department official a criminal offence.

Since the granting of the mining rights on the Smoky River locations was brought to the attention of the Senate and the Government, the leases of Messrs. Shillington and Barnard have been cancelled.

PREDICTS GREATEST COAL SHORTAGE.

Chicago, June 29.—Government coal production figures point to "the greatest coal shortage in history" next winter unless production is stimulated immediately 25 per cent. or more throughout the nation, according to a statement made public to-day by F. S. Peabody, Chairman of the National Coal Association's special committee dealing with the prospective shortage.

"The information gathered by the committee is that at the present rate of production one industrial plant out of every eight in the United States will have to shut down next winter for lack of coal," said the statement, which attributed the falling off in production to the extremely low demand.

The bituminous coal shortage of 65,000,000 tons for the first 24 weeks of 1919 must be wiped out and production increased 30 per cent. the remainder of the year to meet the nation's requirements of 530,000,000 tons, according to the statement.

EDITORIAL

CANADA'S COAL INSUFFICIENCY.

Mr. White, the Consulting Engineer of the Commission of Conservation, is directing the attention of the public to the menace to the general stability of Canada arising from the absence of a developed supply of coal within the confines of Canada.

Dealing with the dependence of Canada on the United States for coal, Mr. White remarks "a nation pressed by the demands of its own people may be compelled under certain conditions to deprive other nations, in part, at least, of even the necessaries of life until the needs of its own citizens are met."

So far as coal is concerned, the United States can supply Canada with all the coal we require, and more, because the United States is the most richly coal-endowed nation in the world, and it has also brought the development of its coal seams to a point unprecedently and phenomenally large. There is no adjective to describe the United States coal industry more fitting than the favorite expression of our late enemies —"colossal." Superlatives are necessary when dealing with an industry that produces almost 900,000,000 tons of coal annually.

The danger, to our mind, that arises from the neglected and undeveloped state of Canadian coal mining, is not a danger of being deprived of our coal supply, except it be through congestion of traffic and insufficient transportation facilities aggravated by bad weather, but lies in the fact that undeveloped natural resources are the equivalent of non-possession of such resources.

Our readers will know that this Journal has urged for over a decade serious consideration of the dangers that lie in our utter dependence on the United States for a coal supply. We have submitted the proposition that economic dependence sooner or later must bring political subservience, and we can see no escape from the implications of this proposition.

A consideration of the coal statistics of Canada will show two outstanding features, first that Canadian coal production is either stationary or declining. We submit that if the coal production of Canada is stationary, it is on the down grade, because in this growing country, if an industry of such basic importance as coal production is not advancing it is losing ground. The second feature is that the per capita consumption of coal in Canada is increasing, and the total tonnage of coal consumed in Canada is going up very rapidly, but that the importation of United States coal is going up more rapidly than either.

The total production of coal in Canada was saved from showing a disgraceful slump in the past two years by the increased production from the Alberta collieries, and it was then demonstrated that Canada can get along by consuming the product of its own coal-seams rather better than some faint-hearted people had dared to anticipate. We can always manage without that which we cannot obtain, and it is interesting to know how much greater a value attaches to a supposedly inferior product when no better is available. In times of stringency Canada is not forced to substitute "ersatz" products, or mere imitations of the real thing. Canada has coal-seams in abundance, containing a plentitude of excellent fuel, and while it is true that our greatest coal deposits are situated inconveniently far from our great centres of population, as they exist to-day, it is equally true that even those coal deposits which are close at hand are neglected and to a great extent despised. People in Winnipeg thought they were suffering hardships when asked to burn "soft" coal last winter, but they found it quite feasible, and it may be remarked that there is no "hard" coal in Europe.

If Canada's coal output were marching even on a "fifty-fifty" basis with her consumption, as it did for many years, the outlook would be more tolerable, but in the matter of coal-mining, as the United States figures go up, ours go down, and that is the discouraging feature.

Another discouragement is that we are paying for coal by a depreciated currency, at higher prices than coal has previous sold for, and we are buying more of it, to which we may add that every ton of coal mined in the United States that might have been mined in Canada, increases our financial embarrassment and disadvantage. This feature, however, is we trust a passing one, and while it is sufficiently serious, it is not so serious as the decay of our domestic coal-mining industry.

THE "CANADIAN FERTILIZER."

The latest addition to Canadian technical periodicals is the "Canadian Fertilizer," published by the Biggar Press of Toronto, and we think the appearance of such a paper has its significance and should interest mining men, who are quite closely concerned with the production of artificial fertilizers. Lime, sulphur, and phosphates in various combinations are all products of the mine, and the market for their sale is wide and capable of great extension.

The use of sulphate-of-ammonia and basic-slag fertilizer, two of the ordinary by-products of steel plants,

are only in the early stage in Canada. The home market for sulphate has hitherto been neglected by Canadian manufacturers because it could be more easily sold for export. There are great possibilities in the popularization of sulphate-of-ammonia for use by the amateur and allotment gardener, if a neutral salt, prepared in a dry and easily distributed form, were to be placed on the market in attractive packages. Sulphate-of-ammonia is usually a chief component of the "plant-foods" sold as proprietary preparations by wholesale houses, under fancy names. The sale of ground basic-slag has never in Canada reached the demand, and the value of this fertilizer is widely admitted by agriculturists.

It is interesting to know that there is a probability of the plant of the British Chemical Company at Trenton, Ontario, being used as a fertilizer manufactory. Canadian apatite being employed. The Canadian apatite mining industry was killed by the competition of the enormous and easily mined deposits of the Southern States, but the increase in freight rates has lessened the comparative disadvantage of the Quebec deposits. The combination of the fine sulphuric acid plant at Trenton, with locally produced pyrites and apatite should render possible a notable increase in home production of fertilizers.

If the "Canadian Fertilizer" provides a medium that will enable Canadian producers of fertilizing materials to get into touch with the Canadian agriculturists, and thereby cultivate and supply a demand that is only in its beginning, it will serve a very useful purpose. This country is under no necessity to import fertilizers.

CORRESPONDENCE.

Exploration in the Porcupine Gold Area.

To the Editor of the Canadian Mining Journal:

Sir,—During a recent hurried trip to the Porcupine district I was impressed by certain features regarding the development of the area as a whole. My object in wishing to record those impressions is not to criticise the operators in the district nor to air my own views, but to invite the discussion of other engineers who are better informed on the geology and development of the district.

The large number of mining or prospecting plants scattered over a large area is striking. The view obtained from the train window from the time it leaves Porcupine until it reaches Timmins gives an observer the impression of being in the midst of a great mining region, comparable to the copper or iron ranges of Michigan, or the gold-bearing banket of the Rand. The galvanized-iron-covered shaft and power houses, which are universally used in the district, with the attendent dumps from exploratory openings, are to be seen on every hand.

The fact that many of these plants are closed at the present time is owing in part to the conditions brought about by the war, but probably the greater part of them would be closed if labor conditions had remained normal. This is inferred from the fact that of the large number of operations only a few have become producers. Evidently, the remaining plants stand as monuments to the willingness of people to the long shots in the mining business. The advisability of occasionally taking a long shot in mining is not under discussion; the custom is too obviously essential to need argument. Rather, it is the object to scrutinize the practise from the standpoint of making the long shot as short as possible, and secondly to prove the likelihood of its hitting something as economically as possible.

The large number of properties at which extensive prospecting work has been carried on and the few mines resulting inclines one to the opinion that not sufficient discretion has been used in selecting ground for development. To erect expensive plants, sink shafts and drive shafts on a piece of ground which has as its only recommendation a certain nearness geographically to the Hollinger is too great a speculation. If nearness to a great mine is backed up by geological evidence the case for a property is strengthened, and if in addition a vein of good ore is exposed at the surface the expenditure of a limited amount of money is usually advisable. But to spend large sums without some such basis is rash indeed.

This brings us to the other point, namely, the expense necessary to be incurred in definitely proving that a piece of ground has or has not the makings of a mine. The impression that money has been spent too lavishly on exploratory plants is easily acquired at Porcupine. The buildings, headframes and other surface equipment are usually so elaborate as to suggest that they were erected to serve real mines rather than exploratory operations which had only possibilities of developing into real mines. Also the dumps accompanying these plants are large, and the question is pertinent whether diamond drilling, which requires such a small initial outlay for plant, could not in many cases have answered the requirements of the sinking and drifting operations.

Finally, it is my opinon that if a large proportion of the money spent in prospecting in this district had been used in well directed reconnaissance work in Ontario's vast expanse of unexplored territory the results probably would have been better . A group of mining men who are ready to take a reasonable mining chance would fare better by spending money looking for new districts or new mines with favorable geological conditions rather than gambling on unlikely looking groun which happens to be near a great mine. Also, when a decision is made to give a showing a try-out the prospecting and development expense should be kept at the lowest possible figure, at least until the work gives distinctly encouraging results.

I wish to repeat that these observations are not made in a spirit of criticism. They are based on a very brief stay in the district, and more careful investigation might have caused me to alter these views.

L. H. GOODWIN,
Mining Engineer,
New York.

At a meeting of the Manchester Geological and Mining Society on Tuesday, it was intimated that Lieut. Brown, one of the aviators in the Atlantic flight, was a member of the organization, and on the motion of the President (Mr. Orchard) it was decided to send a letter congratulating Lieut. Brown on his fine and historic performance.

Matachewan Gold Area

The Otis-e and Davidson Gold Deposits

A description by H. C. COOKE, with introductory comments by R. E. HORE.

In the June number of "Economic Geology," H. C. Cooke, of the Geological Survey, Ottawa, has an article on "The origin of the gold deposits of Matachewan district, Ontario." The deposits referred to are those known as the Otisse and Davidson, some information concerning which was published in a preliminary report by A. G. Burrows, of the Ontario Bureau of Mines some time ago.

Since the report by Mr. Burrows, a considerable amount of work has been done on the Otisse proper-

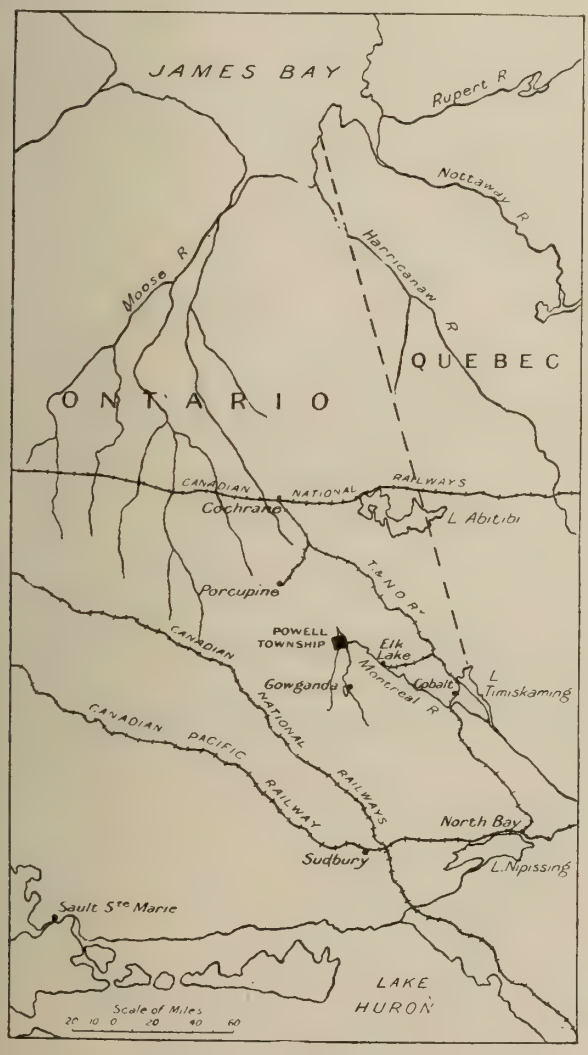

Fig. 1.—Sketch map showing location of Powell Township.

ty, now being operated by Matachewan Gold Mines, Ltd. Last summer, when the writer spent a few hours at the Otisse property, men were at work completing camp buildings and removing surface debris preparatory to sinking a shaft. A number of trenches had exposed the rocks and veins in many places. A diamond drill was in operation. Dr. Cooke examined the property carefully just before I visited it, and the operators have been looking forward to seeing the geological report. They should find in it much that would help them in obtaining information as to the nature of the deposits and the rocks that enclose them. During the past winter the property was idle. Work was resumed this spring, however, and important developments may be expected this summer.

Much remains to be learned about the deposit, but sufficient is known to encourage the operators to test the property carefully. When I visited the property, I found it to be a very promising one; but one that could only be properly described if I were given all the available information, so that I might intelligently put together my own observations, and the results of the operator's testing and sampling.

My purpose in writing this article is to make available to our readers some information concerning it which has been obtained at the public expense, but which, by permission of the Geological Survey, has been published in the United States instead of in Canada. Dr. Cooke has written an excellent paper. It is unfortunate that the policy of the Department of Mines should detract so much from the work of a competent and industrious geologist.

With regard to the nature of the ore and wall rocks I might be permitted to suggest that development will show that gold occurs in the Otisse deposits in the form of the native metal at depth as well as at the surface, for there is native gold in the deposits near the surface that was not near the surface when it was formed. I would also predict that in the altered wall rocks it will be found that much of what Dr. Cooke calls calcite is in reality an iron-magnesium-lime carbonate, such as occurs in many other Ontario gold deposits. Rocks largely composed of such carbonates I have called ferrodolomites. They are formed from rocks of many kinds by the carbonating action of solutions such as deposit gold. This characteristic of Ontario gold deposits is so common that I venture the suggestion with regard to the Otisse deposits without analysing the rocks, being quite satisfied in my field examinations at the Otisse that such is the case.

Gold deposits of this type in Northern Ontario are much the same at depth as near the surface. The gold is in the form of native gold. Much of the so-called "auriferous pyrite" is merely a mechanical mixture of native gold and pyrite. There is no known reason why such ore as occurs near the surface at the Otisse property should not be found at any minable depth. I believe that it will be. There is, of course, a little surface alteration and residual deposits that are locally quite rich in gold; but the freshly broken ore quite close to the surface is of a character that might be expected at any depth that is likely to be reached in mining operations. It is reasonable to expect that an important mine will be developed by Matachewan Gold Mines, Ltd., on the Otisse property.

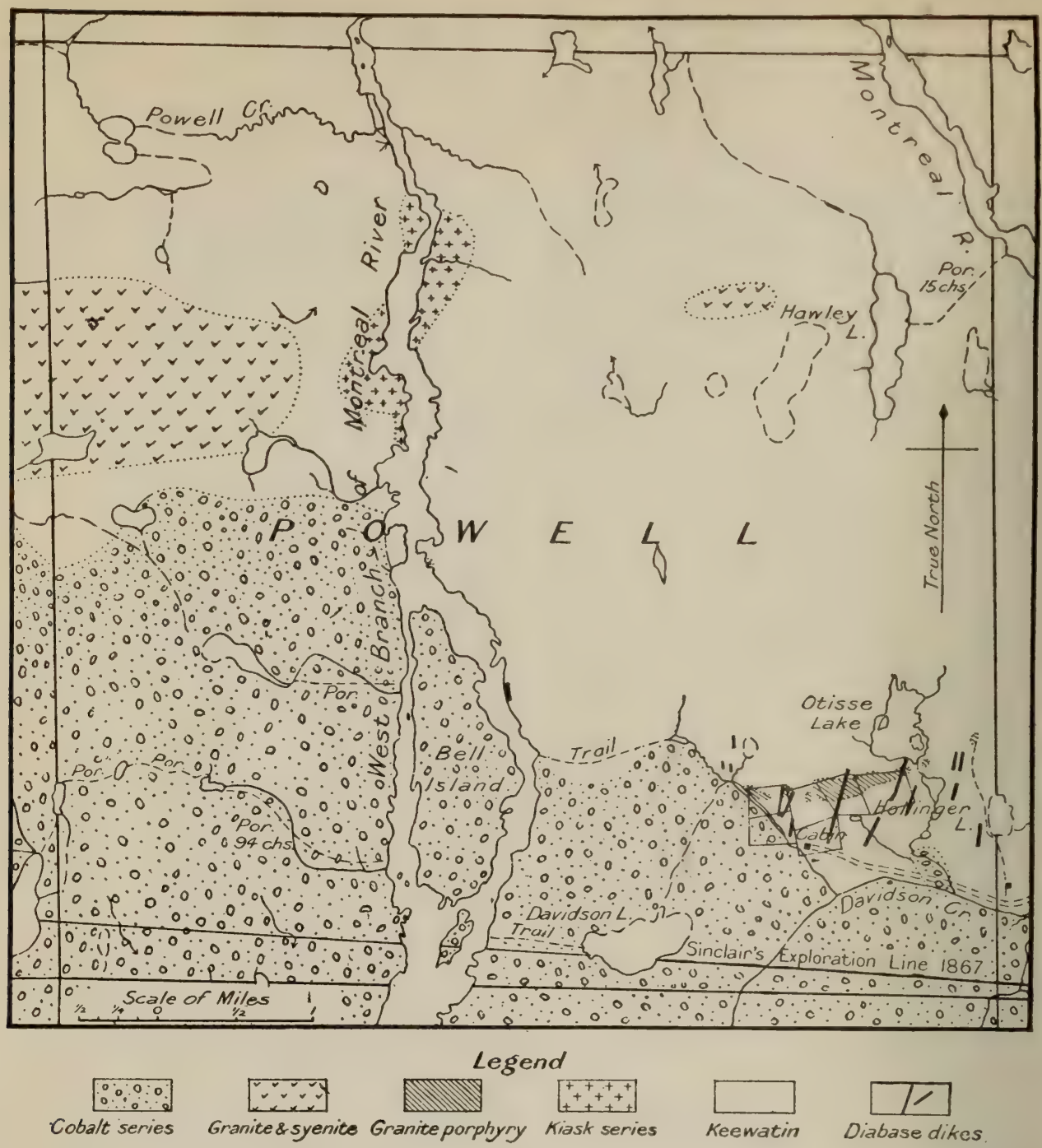

Fig. 2.—Powell Township, Northern Ontario. The claims near Davidson creek are those on which important discoveries have been made.

Dr. Cooke has, in his paper, directed attention to a type of deposit that gold prospectors will do well to examine carefully — small pegmatite masses enclosed by carbonated grey rocks that are sprinkled with pyrite. Early development work at the Otisse showed good gold values in such pegmatites and in the pyritic ferrodolomite. The latter is a dull finely-grained grey-colored rock, composed largely of carbonates that weather rusty, and other constituents which vary according to the original character of the rock and the degree of alteration. The rocks which are so characteristic of Ontario gold deposits. The carbonating is evidently done by solutions escaping from fissures and is common along auriferous quartz veins. In the case of the Otisse it is pegmatite composed of feldspar and quartz instead of ordinary quartz.

The Davidson Deposits.

Of the Davidson deposits Dr. Cooke says:

The ore bodies of this property are found in the schists surrounding the intrusive. Little is known as yet about the nature of the ore bodies beyond what can be seen on the surface, as drilling had not been carried far enough at the time of examination to show with certainty the connection of the subsurface ore bodies with the surface ores. Many of the statements here made will probably therefore have to be revised at a later date.

"The schist ore bodies are lenticular. While this has been proved in only two cases by the removal of

the drift from the whole outcrop of the ore body (namely those at the south ends of trenches 8 and 9, Fig. 5), the fact that ore bodies crossed by a trench can rarely be picked up in a parallel trench 50 or 100 feet distant, indicates a similar shape for these also. Drilling is at present being conducted with the object of testing the hypothesis that the lenticular outcrops are but the surface expression of ore shoots which may have a considerable downward extension. The size of the ore bodies varies greatly; small bodies a few inches or feet in width are numerous, while the largest so far found is about 75 feet in width. The large bodies lie with their long axes approximately parallel to the bedding planes of the tuffs, and may eventually prove to have some relation to the secondary folding. The position of the smallest bodies, those in general less than a foot in width, does not seem to have been controlled by the bedding, but by joint cracks, so that they lie in various positions.

The internal structure of the ore bodies of the Otisse type is indicative of their origin. Fig. 5 shows on a large scale one such ore body about 12 ft. in width. At the centre there is a body of rather siliceous pegmatite about 3 ft. in width measured along the trench; on each side a band of altered and mineralized rock, about 3 feet wide on the south side and 1½ feet wide on the north side. The alteration, which will be described more fully later, consists mainly of calcitization. The mineralization consists of pyrite, usually auriferous. An outer zone of rock, altered but not mineralized, flanks the altered and mineralized zone; this is 6 feet wide on the north side, and slightly less than a foot on the south. The light grey, altered rock grades into the dark green country rock in a short distance, but without any sharp boundary line. The gradational zone is commonly an inch or two in width. The line of contact is wavy, and frequently embayed in a highly irregular manner.

"The structure described is characteristic of all the ore bodies in the schist, although it is sometimes rendered more complex by the intrusion of two or more veins of pegmatite within each other's zone of influence, or its recognition may be observed an insufficient development which exposed only ore without the central pegmatite. Variations occur in the composition of the central dike or vein, the width of both inner and outer zones of alteration, and the extent of the enrichment of the inner zone and the alteration in both. The data so far secured are not sufficient to determine the relation between these variations, but enough has been done to indicate that the composition and size of the central dike or vein are the principal governing factors, while there is also a possibility that some of the country rocks may have been more easily altered than others.

"The data bearing on possible differences in susceptibility to alteration in the country rocks are scanty. All of the volcanics are seen under the microscope to be similar in composition, their differences being mainly in the relative proportions of the constituent minerals. If one rock is more susceptible to alteration than another, it cannot be due to difference in composition, and the cause must be sought in physical differences, such as texture. The tuffaceous types, the rhyolite and basalt tuffs, undoubtedly had originally a more open texture than the massive basalts; and when sheared, their lesser competency resulted in their becoming more schistose than the massive rocks. Both their original texture and their greater subsequent schistosity would make them more permeable to solutions, and allow of a larger degree of alteration. As Fig. 5 shows, most of the ore bodies are localized in the rhyolite tuffs and the basalt tuffs which directly underlie them. However, the fortuitous location of these tuffs next to the intrusive makes it impossible to conclude definitely that the localization of the ore bodies is due to the influence of the country rock and not to chance, until the development operations are carried further around the boundaries of the intrusive so as to allow comparisons to be made.

"Data connecting the size and composition of the veins and dikes with the width of the altered zones and the intensity of the mineralization and alteration are more plentiful, but not complete. Dikes of red porphyry, whose composiiton is closely that of the main body of intrusives, have had little effect on the country rock. These may be seen (Fig. 5) in trenches 5, 7, 14. Occasionally they have caused a small amount of pyritization in the wall rock, but never any visible alteration. An exception is the dike cutting trench No. 15. Flanking this dike is a wide zone heavily mineralized with coarse-grained pyrites, but the country rock is slightly, if at all, altered, while the pyrite, unlike that in other ore bodies, has a very small gold content.

"Two dikes of what the miners term "gray porphyry" are exposed by trenches 10-13 (Fig. 5). The outcrops of these dikes, which are lens-shaped, are about 100 feet long, and 10 to 20 feet wide. In their composition they are intermediate betwen a pegmatite and the red porphyry. The amount of feldspar present is so high that they would unhesitatingly be classes as igneous rocks in the field or from the hand specimen, but under the microscope they are seen to be considerably more siliceous than the red porphyry. Alteration of the feldspar to calcite has taken place. The dikes contain sufficient auriferous pyrite to yield gold values varying from $3 to $50 per ton, with an average of about $10. The rhyolite tuff around and betwen the dikes has been only slightly altered, but has been somewaht pyritized over a distance varying from 10 to 25 feet from the dikes. The tenor, however, is low, on the whole $2 per ton or less, although occasionally a high assay has been obtained, due no doubt to the accidental inclusion of a locally enriched portion in the specimen taken.

"The orebody indicated in Fig 5 at the south end of trenches 7 and 8, has as its centre a vein of pegmatite about 4 feet in width. This pegmatite is now much weathered, but can still be seen to have been highly feldspathic, probably about 40 to 50 per cent. feldspar, the remainder mainly quartz. The vein lies parallel to the bedding, and the mineralized and altered zone is approximately 12 to 15 feet in width on the southeast side, and 7 or 8 feet on the northwest side. Beyond the mineralized zone the rock is altered with but slight mineralization for 3 or 4 feet further. The gold content in this lens of ore is among the best on the property, averaging from $12 to $15 per ton. The alteration in the mineralized and altered portions has been intense, fully 75 per cent. of the rock having been replaced by calcite in the portions nearer the central vein of pegmatite.

"Fig. 6 also illustrates the general extent of the alteration and mineralization induced by a pegmatite containing about 8 per cent. of feldspar. It will be

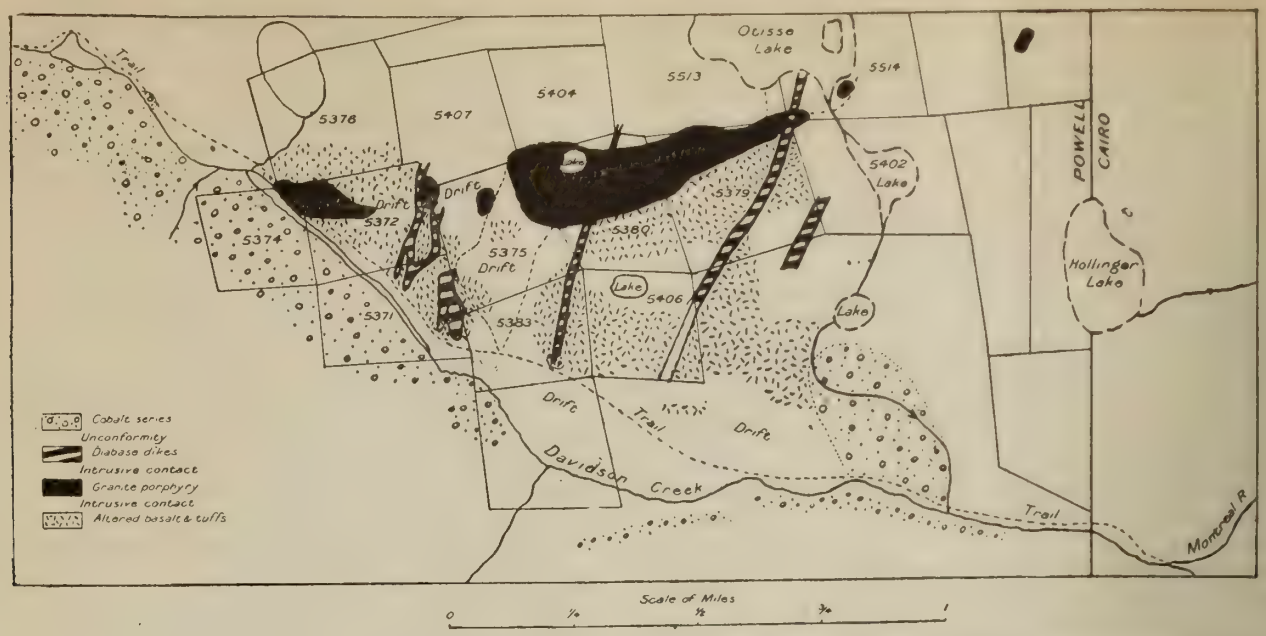

Fig. 3.—Geology of the gold area, Davidson claims 5371, 5372, 5374, 5375, 5383. Matachewan Gold (Colorado-Ontario) claims 5379, 5308, 5402.

observed that although the central vein averages nearly as wide as in the example just described, the total width of the mineralized zones on both sides of the vein is only 4½ feet, as opposed to 18-20 feet. The total width of altered rock with and without mineralization is only about 12 feet, as opposed to 25 feet or more. The gold content in the two cases appear to be about the same, while the intensity of alteration to calcite is slightly less.

"In trenches Nos. 3 and 4, among others, narrow veinlets both of pegmatite and quartz may be seen. The quartz veinlets are never more than about an inch thick. In trench 3 a pegmatite veinlet one quarter to one half inch in width is surrounded by a mineralized and altered zone about 2 feet in width. The pegmatite is about 30 per cent. feldspar. The mineralization is fairly heavy, sufficiently so to give about $10 per ton. In trench No. 4 a similar narrow vein of pegmatite was observed, whose feldspar content is confined to a few small crystals along the wall of the vein. Alteration extends only about 2 inches from the walls, and mineralization is comparatively small. In the same trench a veinlet of quartz was observed, about an inch in width. On each side of it the rock is altered for a distance of about a foot, but the mineralization has been slight.

"The facts described appear to justify the following conclusions: (1) The ore bodies have been formed by solutions emanating from the dike or vein at their centres. These solutions have altered and mineralized the country rocks. (2) The tuffs may have been more easily altered and mineralized than the altered basalts. (3) The extent of the mineralization and alteration are related to the size and the composition of the central dike or vein. The strongest alterative and pyritizing effects have been exercised by the pegmatites, while the effects of the end members of the series, the porphyry dikes and the quartz veins, have been slight. The pegmatites containing 25-50 per cent. of feldspar appear to have produced the most powerful mineralization and alteration. Other things being equal, the extent of alteration and mineralization is roughly proportional to the size of the dike or vein. (4) The gold content of the dike and vein-forming solutions was also dependent on their composition. The pyrite deposited by the dikes of red porphyry contains relatively little gold. Gray porphyry dikes carried more gold, sufficient to give a good tenor within the dikes themselves, but not, apparently, to mineralize the surrounding rocks to any great extent. Pegmatites appear to have carried the maximum of gold, which they deposited as auriferous pyrite both in the veins and in the altered wall rocks; while the solutions forming the pure quartz veins carried little gold.

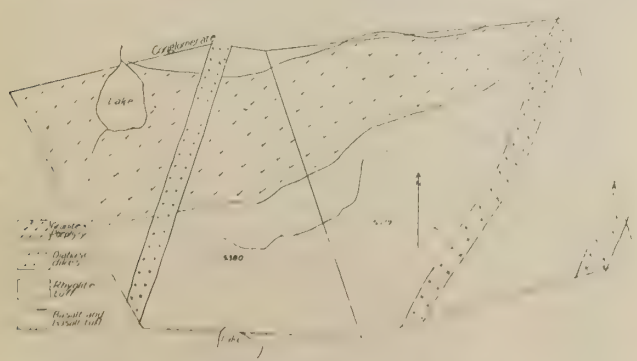

Fig. 4.—Geology of Otisse claims as shown by work done up to Oct., 1918.

"The only primary ore mineral present appears to be auriferous pyrite; however, a detailed study of the ores by the aid of the reflecting microscope has not as yet been made. If ore minerals other than pyrite are present, they are in minor amount. The gold occurs only in the pyrite, in what form is not known. Native gold is not found, except in oxidized surficial portions. In general a high pyrite content indicates a correspondingly high gold value, although in one or two places this has not proved true. In the pegmatites the pyrite is coarse-grained, in crystals and aggregates several mm. in diameter; but in the adjacent schsts the pyrite is always fine-grained, 0.3-0.5 mm. in diametr of crystal. Only in one case was this not found to hold good—in the ore body in trenches 14 and 15 peripheral to the dike or red porphyry in 15. There, the pyrite is very coarse-grained.

"The wall rock alteration accompanying the mineralization of the portions farthest from the central vein is seen to consist of calcitization, pyritization and sericitiation, with probably some albitization. Fine-grained magnetite originally present in the altered basalts in amount up to 5 per cent. is converted into sulphide, forming a few crystals up to 0.5 mm. diameter instead of a multitude of small grains. Possibly also some pyrite may be added. Feldspar, which is commonly oligoclase-albite either lath-like or irregular in shape, is entirely recrystallized into a fresh, clear, granular albite, with possibly a slight increase in soda content. Chlorite disappears entirely, while 10-15 per cent .of sericite is formed, and calcite, commonly forming 10-20 per cent. of the original rock, is increased in amount to 40 to 50 per cent. Nearer the central vein, under the more intensive action of the solutions, further changes take place. Albite and sericite tend to disappear entirely; a great addition of pyrite occurs, while the calcite content increases enormously, and may replace everything but the pyrite. A little quartz is sometimes present, but always in vague vein-like forms, and not a part of the true replacement. The pegmatite of the central vein itself also has very commnoly suffered a partial alteration, in a replacement of a part of its feldspar by calcite.

"The composition of the solutions which deposited the ores may be inferred from the results of their action on the country rocks. They were evidently rich in sulphur, and also carried iron. A great deal of carbon dioxide was present, and the lime content was high. They carried potash and soda, but probably only in small amount. They dissolved and removed silica, alumina, and magnesia primarily, while potash and soda were also carried away where the reaction was more intense, nearer the central veins.

Summary and Conclusions.

1. The internal structure of the ore bodies, consisting of a pegmatite vein at the centre, a middle zone of mineralized and altered rock, on each side, and an outer zone of altered rock without mineralization, which grades into unaltered country rock with irregular and embayed contracts, is clear evidence that the deposits in schist have been formed by the alteration and mineraliation of the country rock by solutions coming up along the central vein. The partial calcitization of the feldspar of the pegmatite indicates a change in the character of the solutions during the formation of the ore bodies.

2. The serial composition of the various veins of pegmatite, varying from veins of pure quartz up through pegmatites of increasing feldspar content, to dikes of pure porphyry, indicates an igneous origin for all.

3. The satellitic arrangement of the veins, in that with few exceptions they are grouped within an area bounded by a line drawn about 1,000 feet from the edge of the porphyry mass, with the major number within 500 feet, points conclusively to their genetic connection with the porphyry intrusive.

4. Veins or dikes approaching the porphyry in composition, deposited little or no gold, but did in places deposit pyrite. They had no strong alternative action on the wall rocks. Pegmatites deposited auriferous pyrite, and had a powerful alterative action on

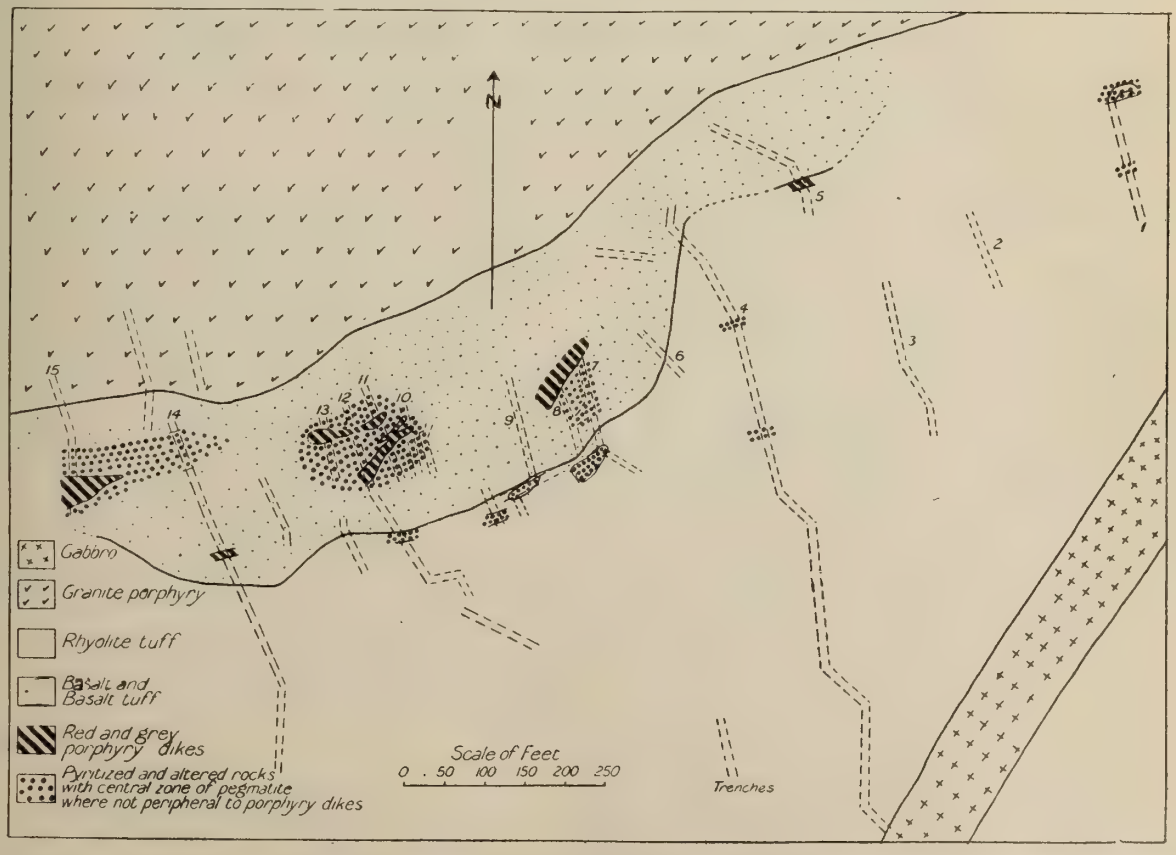

Fig. 5.—Sketch map of portions of claims 5379 and 5380, where the principal discoveries have been made. made.

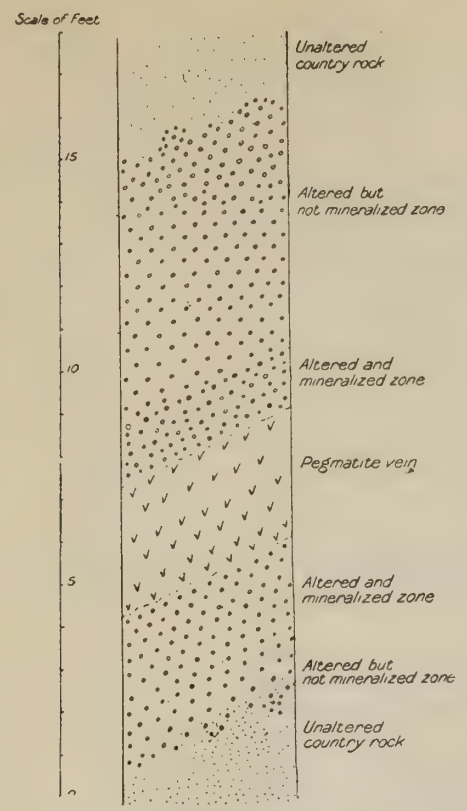

Fig. 6.—Sketch showing internal structure of orebody uncovered in No. 1 trench.

the wall rocks. Quartz veins had little action on the wall rocks, and deposited little or no pyrite. Other things being equal a rough proporton exists between the size of the vein and the size of the altered zone around it.

5. It is concluded, therefore, that the schist ores of the Matachewan district were deposited by juvenile solutions originating as the last products of the differentiation of masses of intrusive granite porphyry. The solutions were at first rich in silica, soda and alumina, which crystallized out first to form the material of pegmatite veins. The separation of these constituents left the solutions relatively enriched in lime, carbon dioxide, iron, sulphur, potash and gold, and their reactions with the wall rocks caused the formation of replacement deposits whose principal minerals are calcite and auriferous pyrite.

6. There is little direct evidence to connect the gold of the Davidson property with the porphyry, except the fact that the veins are confined within the intrusive mass. However, the proof that the neighboring stock, which is petrographically identical with the Davidson porphyry, carried gold, renders the conclusion inevitable that the gold of the Davidson property was also a magmatic constituent. The differentiation has here continued uninterrupted to the stage in which the mineral constituents of the magnetic solutions are silica and gold, and these are deposited as quartz with native gold.

The Oil Concession Correspondence

(Concluded from issue of July 2nd.)

THE CARVELL-MEIGHEN CORRESPONDENCE.

OTTAWA, 5th February, 1919.

My Dear Meighen:—

I am enclosing herewith some correspondence which speaks for itself, but perhaps I should say that, about a month ago, while in Montreal, I met Mr. Mathew Lodge of Moncton, who told me that an arrangement was now being made by which all the oil lands in the west should be handed over to one company for exploitation. I told him I had never heard of the matter before and am now in receipt of this correspondence.

I would be very glad indeed if you would let me know how the matter stands from the standpoint of the Government, and would ask you to kindly return the correspondence.

(Sgd.) F. B. CARVELL

February 8th, 1919.

Dear Mr. Carvell:—

I have yours of the 5th enclosing letter from Mathew Lodge of Moncton, N.B., with some clippings. I return the enclosures herewith as requested.

The Shell people made through their Canadian Agents two proposals in succession to me, looking to obtaining oil leases in the West on certain conditions. I definitely and finally refused each. Later, when in England, their representatives discussed the subject more fully with me and along wholly different lines. These at my request they embodied in a subsequent memorandum and definite proposal. I took this up with the sub-committee of Council and we reviewed the whole scheme, clause by clause. We decided, however, that as the resources might possibly be transferred at an early date to the Provinces, no step should in the meantime be taken. The last proposal of the Company has something to commend it, but I could not recommend it for acceptance at all, as it stands. The subject has never been considered in Council, and of course would be, before I would think of taking action.

I might say that I thoroughly agree that any Canadian concern should have ample opportunity to offer the like or better terms in any event.

Yours truly,

A. MEIGHEN.

More Correspondence.

Edmonton, Alberta, 16th Feb., 1919.

Hon. Arthur Meighen:—

Rumors persist here that whole north country to

be blanketed by shell oil contract. Political opponents propose protesting in Alberta legislature Monday. Can you give us any information; can we deny allegations in toto. Contract would arouse fierce opposition among all here. Wire reply.

A. T. ERVINE.

Telegraph.

Ottawa, 17th February, 1919.

A. T. Ervine, Edmonton, Alta:—

No concession granted Shell Company. Government has not yet considered Company's proposals.

ARTHUR MEIGHEN.

Ottawa, February 17, 1919.

Dear Mr. Meighen:—

I understand that the Royal Dutch or Shell Company have under way the leasing of large areas in Canada for the purpose of drilling for oil or natural gas.

Any information you can furnish me with regard to concessions granted this firm or applications under consideration will be much appreciated.

J. E. ARMSTRONG.

Ottawa, February 19th, 1919.

Dear Mr. Armstrong:—

You evidently had brought to your attention certain suggestions that appeared in the Press respecting the setting apart of large areas in Northern Alberta to be placed at the disposal of a company which dedesired to drill for oil and natural gas. There is no intention on my part to consider and proposition of that kind at the present time. Owing to certain representations made in some of the Western newspapers that the Government was giving way a very large territory for this purpose, many letter have been sent to me strongly objecting to the proposal. There is really no information I can furnish you in the matter other than above.

A. MEIGHEN.

Clerk Legislative Assembly.

Edmonton, Feb. 19th, 1919.

Sir:—

Last night I sent you the following telegram:

"I am instructed to wire you the following resolution, which was unanimously passed this day in the Legislative Assembly of the Province of Alberta.

"WHEREAS it is reported that the Dominion Government is about to grant extraordinary and exclusive concessions of petroleum territory in Northern Alberta to an Oil Syndicate on terms oppressive to the people of this Province.

"AND WHEREAS negotiations are pending for the transference of the Natural Resources of the Provinces.

"NOW, THEREFORE, be it resolved that in the opinion of this House no such disposition of petroleum lands or any other natural resources should be made."

Which I now confirm.

JNO. R. COWELL,
Clerk of the House.

Ottawa, 20th February, 1919.

Dear Sir Thomas:—

I have yours of the 19th with copy of a telegram received by you from J. R. Cowell, Clerk of the Legislative Assembly of the Province of Alberta, enclosed herewith. I have communicated with Mr. Stewart, the Premier of Alberta, expressing my surprise that such a resolution should have been submitted to the legislature based admittedly on a report, and which resolution assumes by its very wording an utter disregard of any sense of public duty on my part, and is intended to lead people to believe that some great wrong is about to be done, unless they take steps to avert it.

I have pointed out to Mr. Stewart that the application to which the resolution refers has not yet been introduced to Council, and that until the question of the natural resources has been settled, it is not my intention introducing it.

Yours very truly,

A. MEIGHEN.

Edmonton, Alta., Feb. 22nd.

Sir Thomas White, Acting Prime Minister:—

Large meeting of Citizens of Edmonton and Peace River Country unanimously protest against granting any monopolistic Concessions to Northern oil rights moved by Hon. A. G. McKay, seconded by James Ramsey, M.P.P., local members for city of Edmonton being requested to move for return of all papers of any such proposed agreement.

JOSEPH A. CLARK,
Mayor.

The Late W. J. Hanna's Letter.

Toronto, Ontario, March 1, 1919.

Hon. Arthur Meighen, Minister of Interior:—

Dear Sir:—

With relation to an application which I understand has been made through your Department on behalf of the Shell Transport and Trading Company for a reserve of 250,000 square miles, and a subsequent choice therefrom of 25,000 square miles of the potential oil territory of Alberta and Northwestern Canada, may I express my views as to the merits of the proposal laid before the Government and the menace to the country which it contains.

If I am rightly informed, this application is for an exclusive right to explore and exploit all that territory lying between the fifty-fifth and sixty-fifth parallels, bounded on the east by the eastern boundary of British Columbia. I must point out to you that this application constitutes an attempt to absorb, in one concession, all the potential oil land of Canada with some negligible exceptions. Of this I feel confident that I am correct, and confirmation of this belief, I am quite sure, would be forthcoming from the geologists of your own Department if the question were placed before them in a manner such that they could answer in general terms in and in the light of the knowledge available of the geology of Canada.

If, as I believe it to be the case, it is being implied that the applicants are venturing into unknown country in search of oil where it is merely assumed to exist, the implication is not consistent in view of the presence of volumes of compiled data, the product of years of research which have been piling up against the way of Northern Development in the Geological Department at Ottawa.

Or, if it is the intention of the applicants to have it appear that they are venturing into a wilderness toward the development of the resources of which noth-

ing had been done nor is likely to be done, except through their agency, then the credit that has been pledged by the Dominion of Canada and by the Province of Alberta in extending the railway lines to the great waterways of the north and the faith that has been demonstrated by the pioneers must surely have been hazarded in vain. I doubt very much if the Canadian people who have guaranteed these railways or the pioneers who have devoted the years to the opening of the North will view with dispassion any proposal to hand the greatest potential resource of the northern empire to a body of strangers attracted only by the possibilities made accessible and known by these pioneers.

Let me point out to you another aspect of the application. I refer to the size of the grant asked. I wonder if the applicants realize the extent of that for which they ask? A selection of twenty five thousand square miles (16,000,000 acres) of the best oil land within the dowry of Canada is what they ask. In the whole State of California, which produces a wealth in oil of one hundred million barrels a year, the second oil state in the American Union, the entire total area of oil land that is actually producing is not greater than one hundred thousand acres. In the State of Wyoming, which produces 40,000 barrels of oil a day, the whole producing area is not greater than twelve thousand acres. Just the amount that may be protected by one drill under the present regulation regarding leases in the country for which the application is made. The whole oil field of Western Ontario, from which millions have been taken and which is the source even to-day of the entire Canadian output, is not greater than thirty square miles all told. And yet me point out that there is not in the whole world to-day twenty-five thousand square miles of actual producing oil territory, including every acre in every latitude and in every country.

Until the application has been reduced to the form of an agreement it would be impossible to discuss its merits, but I feel that it should be realized that with the right of transfer, as asked for by the applicants, and with the privilege which such a right would entail of leading the profits through a number of subsidiaries before reaching the parent company, it would be possible that the announced profits of a parent company would not overcome the six per cent. cumulative which the applicants ask right to enjoy before sharing any part of the production with the Government of Canada. If a concession were granted on the tentative terms in which this application is made there would be a real danger that the Dominion of Canada would not receive a dollar therefrom.

It is being alleged in support of the application, so I am informed, that there is not the capital available to develop a Canadian Oil supply. In this connection I would like to point out to you that during this coming year the Imperial Oil Company is about to spend upwards of half a million dollars in the search for oil, a large part of which it is intended to devote to the territory for which this application is being made. This Company has on its staff some very competent geologists and has for the past five years had prospecting parties in the field. During the past two years, owing to the fact that some of the best men were called to the front, it has not been possible to carry this work forward as vigorously as would have otherwise have been done, but for this season the Company has already arranged for five field parties to leave Edmonton as soon as the snow is off the ground. These parties will be headed by competent geologists, fully equipped to gather the most reliable data upon the possibilities of the country. Coincidentally, it is intended to test with the drill every reasonable propect of oil located by the geological parties. Plant and equipment for this work has already been secured. Part of it (two rigs) are already at Edmonton, where they have been since last autumn, and the remainder is forthcoming.

This exploratory work is not a new departure upon the part of the Imperial Oil Company. Realizing the importance of developing a Canadian oilfield, the company has for a number of years been active by drilling in the search for oil. Last year operations were carried out in the Fort McMurray district, and for three years past operations have been in progress in the Viking district, both in Alberta. The former operations were within the boundary of the concession applied for by the Shell Company. In the Peace River country, also within the limits of the concession asked, the company, through agents have taken up a considerable area of oil leases and has subscribed to assist local companies in their drilling operations. In the Great Slave lake and McKenzie River districts, beyond the Northern Boundary of Alberta, but still within the limits of the concession asked, the company has had extensive geological search made, and as a consequence of the information brought in it is proposed this summer to send two rigs north by boat to points hundreds of miles beyond rail-head on the Athabasca.

I am speaking not only of what is being done by the Imperial. I am not in a position to speak with authority for anyone else, but in addition other individuals and syndicates amply financed have been active in the Peace River country and there are indications that there will be great activity and healthy rivalry during the coming summer. The allegation, therefore, that the capital is not available to develop the oil field has no basis in fact.

In speaking of these operations by the Imperial in search for oil, I would like to point out to you that any rights which the Imperial has acquired by the way of drilling leases has been the outcome of no special privilege. There have been no concessions of any kind granted to this company, nor have any been asked. We have always felt that under the law as it stands now there is reasonable latitude for any company, large or small, which has a desire to prospect for oil and we will never seek, by way of special privilege, any right which it is not open for others to enjoy. We feel that this policy, which has heretofore been pursued by the Government, will lead most quickly to the development of the oil resources of Canada.

As a grant such as that asked for would place the applicant company in a position of holding and absolute monopoly of the oil business through ownership of the oil resources of Canada. I feel that I cannot allow the application to go to consideration without outlining what the granting of such an application would mean to this company.

You are doubtless aware that the Imperial is an old-established institution, having been incorporated in 1880, and is to-day the second largest among Canadian concerns, admitting first place only to the greatest of Canadian railways. In four years, since the opening of the war, it has paid into the Dominion Treasury in the form of duties and revenues $7,433,707.75, and in taxes of various kind to various municipal and gov-

ernmental authorities in the same period upwards of $3,250,000. It furnished the Imperial Government during the war with 110,810,540 imperial gallons of oil fuel for the British Admiralty. To provide for urgent requirements of the Admiralty and to keep pace with the industrial demands during the war period, and with no balking at tremendously increased cost of construction, the Imperial has, during four years, outlaid on new plant $20,175,954.76 and has invested in buildings $575,812.76. From a purely pecuniary point of view the company could have profited by allowing this new construction to wait until the conclusion of the war had brought costs to a lower level, but assumed these larger capital expenditures rather than see the war work suffer handicap through shortage of supply of oil or for lack of service.

In the Imperial all employees are given an opportunity to become stockholders and a large percentage, both operatives and clerical staff, have done so, and the number is steadily increasing. Five hundred Imperial employees entered military service, and the company from a special appropriation has supplemented their army pay in a way that has been greatly appreciated by the men and their families. During the same period it has provided liberally for its injured workmen, and it carries a sick benefit and retiring allowance plan which protects everyone of its people from want or the fear of want during the entire term of their working years and for as long as they live after the term when, at 65, they become time-expired men in the industrial army of Canada.

The company have refineries at Vancouver, Regina, Sarnia, Montreal and Halifax; has eight hundred distributing stations located at points calculated to best serve its customers; it has eleven ships on the Pacific, Atlantic and Great Lakes and in the midst of stress of war-time conditions it has kept unfailingly supplied the farm tractors of Western Canada, the fishing fleet of the Pacific Coast, the Mountain railways and in fact every activity essential to Canada's part in the war and all this has been done during the entire war period in the spirit that the necessities of the case were the first consideration, the profit secondary.

The Imperial has an investment in the oil business to-day of not less than ninety millions of dollars and within the past five years its stockholders have put in a new money—all cash—$20,340,000. More than two dollars for every one dollar they have taken out.

That an industry touching as it does so intimately the welfare, business and livelihood of thousands of people should be subjected to threat of incursion and raid, such as could not fail to prejudice an investment built up over half a century and to handicap the steady flow of products from producer to consumer, to the loss and embarrassment of all, cannot be in the Canadian national interests.

You will no doubt recognize the effect that the circumstance of such an application as that made by the Shell Company being publicly regarded as under official consideration must inevitably exert upon the further enlistment of capital in the oil industry in Canada, and you will appreciate that the granting of such a concesison would be very nearly equivalent to a destruction of the entire present investment in the Canadian oil industry. I do not for one moment think that the Government of Canada contemplates such a proceeding, but I think it well, nevertheless, to so place clearly before you the inevitable result of such an act. I, therefore, submit the foregoing for your consideration.

Yours very truly,
(Signed) W. J. HANNA.

The Proposal is Not Accepted.

March 28th, 1919.

Dear Sir Reginald McLeod:—

Referring to application of the Shell Oil Group with respect to certain areas in the northern portion of Alberta, and the Northwest Territories adjoining such Province, and the carrying on of oil development there on co-operative basis with the Dominion Government, I have to say that this Department cannot recommend acceptance of the proposals you have submitted.

Yours very truly,
A. MEIGHEN.

Paris, March 30th, 1919.

Prime Minister, Ottawa:—

X185, for Meighen.—Sir Reginald McLeod on behalf of Shell Transport and Trading Company called on me to-day and expressed earnest hope that early decision will be reached as to Company's proposals. He claims that there are other theatres to which they desire to divert their energy without delay if Government decides not to accept their offer.

BORDEN.

Ottawa, 31st March, 1919.

Sir Robert Borden, Paris, France:—

Have decided cannot entertain Shell Company's proposals and notified them some days ago.

MEIGHEN.

PERSONAL.

Mr. A. A. Hassan has opened an office at Fort Worth as geologist.

Mr. George Rogers has resigned as manager of the Churchill Mining Company. Mr. Rogers is in charge of operations at the Wasapika, Westree and Herrick properties in the Wasapika gold area.

Mr. F. W. Gray is visiting the Cobalt silver and Porcupine gold districts.

Mr. R. E. Hore has returned to Toronto after visiting the Huntingdon copper mine near Eastman, Quebec. He is now visiting gold and silver mining districts in Northern Ontario.

Mr. F. M. Connell is at the Huntingdon copper mine, preparing for the resumption of operations there.

Lieut. H. K. Bowen, retired from the R. A. F., has just returned from overseas. Previous to enlisting for active service Lieut. Bowen was in practice as a mining engineer in the north country, and will shortly resume his work there.

Mr. H. J. McCann, has been transferred from the position of Purchasing Agent of the Dominion Steel Company at Sydney to the Montreal office of the Dominion Steel Corporation as Assistant to the President. Mr. McCann has been connected in various capacities with the Dominion Coal and Dominion Steel Companies for the past twenty years, and he has a comprehensive knowledge of the operations and commercial conditions in both the coal and steel ends of the business.

Oil Notes

IN THE PERSIAN OIL-FIELDS.

One drops down from the Imam Riza to the coal-fields. They lie in a Q-shaped cup, and the tail of the Q leads up from Tembi, where the power-house is at the foot of the pass. Two enormous columns of smoke told us where the wells lay. It was escape oil burning. The pipes, which had been cut by the Bawi and Anafizah tribes near Ahwaz in the disturbances of February, were still under repair. Meanwhile the oil which ought to have been feeding the refineries at Abadan had to bee dstroyed. Where there is a good flow, as at Maidan-i-Naftun, the oil floods up and discharges itself at high pressure into the pipes, and is carried by its own momentum into the storage tanks. No pumping is neded. The only difficulty is to control it. To close a valve in the pipe at the surface of the well is simple enough, but it is seldom wise, as the subterranean force which you have unloosed is eccentric and not easily disciplined. A block is apt to disturb the strata and plug up the channels, and create a commotion which may put the well out of action for weeks. So, when the passage to the refineries is stopped the oil and gas are carried off into side pipes and burned. The immense columns of smoke and flame where the escape oil was burning day and night depressed me with an uncomfortable sense of waste. The flames leaped up 60 feet in the air in a circumference of 20 with a roar like breakers, and above them rose a solid column of blue smoke. At a certain height it caught the breeze and was deflected, but it was still so dense that riding under it a full 500 yarns from the flame one felt protection from the sun. The manager laughed at my economical scruples: "If you were a millionaire," he said, "you wouldn't mind if your butler opened an extra bottle of port. Besides, where could you store the oil? It would soon flood a respectable valley.

The oil, it seems, is inexhaustible, and if you humor it and give it its head underground it is singularly docile when it reaches the upper air. Its violence is all subterranean, and the miners' chief anxiety is lest it should spurt up in sudden gushes and carry away rig and derrick. Once above ground it finds its way to the storage tanks and power house. From the pumping station at Tembi it is lifted over the two ranges, the Imam Riza and the Tul-i-Khayyat; and from the second ridge it flows without obstruction to the refinery at Abadan on the Shatt-al-Arab, 142 miles from the fields. The pass over the Tul-i-Khayyat is 1,300 feet, and the pressure on the pipes here is 600 pounds to the square inch. One is struck by the economy of transport. Oil, unlike other products of mines, needs no railway with its costly rolling stock, imported fuel, and gangs of workmen. It supplies its own power like a rational monster pent up in the bowels of the earth and ready to lend a hand in its own release. Both in production and in transmission you have the same economy. Where a well is being bored you will find under one rig a single white mechanic and half a dozen wild-looking Bakhtiari assistants, whose limbs remind one of figures on a Greek frieze. The driller and the tribesmen communicate in a jargon which is neither English nor Persian, but understood by both. It comprises half a dozen adjectives very forcible and explicit, the single inflection of some three common verbs which does duty for all tenses and moods, and a number of substantives mostly of a highly technical kind. The Lur or Bakhtiari in the Persian oil-fields is as familiar with spudding shoes, clamps, gauges, underreamers, and bits as the product of a Schenectady engineering school.

I was taken to a rig where a Canadian was fishing for lost gear. In boring the shaft the heavy blunt-nosed steel bit which pulverizes the rock is attached to the sinker, a sixteen-foot steel rod. This is connected with the wire rope by jars and swivel, and suspended from an oscillating walking beam which overhangs the shaft. The process of boring is simple so long as the string of tools hangs together, but the wire rope, sockets, jars, sinker ,and bit are put to an inordinate strain; and if any of these give the shaft is blocked and work comes to a standstill. Another source of trouble is when the casing of the shaft gives through heavy earth or gas pressure, or the parting of the joints. In any of these emergencies the driller has to lay aside his tools and fish. He may fish for months and not recover the lost part. In that case it is a question of a new shaft and the abandonment of the well—a tragedy of wasted labor, which is the worst thing that can happen to the mining engineer.

I found the Canadian solemnly and patiently fishing while the half-naked Bakhtiaris sat round him wistfully looking for a sign. The trouble had begun two months before with the breaking of the sand-pump, the cylindrical vessel which is lowered after every foot or two of boring to remove the pulverized debris. The pump had broken off and carried away some of the steel rope with it. The driller's first business was to fish for the gear with a tenacious barbed and pronged instrument known as the rope-spear. This he attached to a sinker and let fall heavily among the strands of the cable. He secured his grip, but the pump was so firmly imbedded that it would not give. It was impossible to shift the thing without breaking the line. Heavier machinery had to come into play. So the engineer cut the rope just above the swivel and ran in a series of iron fishing poles with a socket at the end to catch hold of the sinker to which the rope-spear was attached. The bottom pole gave with the socket. Thus the history of the House that Jack built repeated itself, only none of the parts played their part, and every lap in the story was a coup manque. We have now in order from top to bottom—the iron fishing pole with the socket which would not catch the sinker, the swivel and sinker, the rope-spear, the sand-pump, all lying in layers of obstruction some thousand feet underground, blocking up the shaft. It was enough to take the heart out of a man, but the Canadian went on stolidly fishing, and the Bakhtiaris squatted on the floor of the rig loking dully expectant. After a month the Canadian dragged up the sand-pump, which ought by all rules of the game to have been at the bottom of the whole bag of tricks. His next catch was the swivel, which had parted from the sinker. Then he brought up the pole and socket. There remained the sinker and the rope-spear. These, as far as I know, were never recovered. They were probably jammed into the side of the shaft, for when next I heard of the well drilling had been continued. That Canadian fishing for his tools was the most monumental instance of patience and faith I have witnessed.—Edmund Candler in "Cornhill" (Extract.)

Nova Scotia Notes

Dominion Coal Output.—For the first half of the year the production of the Dominion Cape Breton collieries was approximately 1,537,000 tons, being 150,000 tons below the outputs of the first half of 1918. The Springhill Mines in the corresponding period produced 185,500 tons this year, and 201,752 tons in 1918.

It is understood that several of this company's coal freighting vessels have been released from requisition by the British Admiralty, and if this news is confirmed, there is a prospect that the mines may work more regularly than they have during the month of June, when production from the Cape Breton collieries reached only about 220,000 tons, or half of capacity of the mines.

Mr. Walter Herd, who was formerly the Assistant Mining Engineer of the Dominion Coal Company, has returned from overseas and has been appointed as Mining Engineer. Mr. Herd was one of the men selected by the Canadian Mining Institute for nomination to commissions offered to qualified mining engineers by the Militia Department early in the war. Before leaving Canada he was transferred to the Forestry Corps, in which he performed important duties, and was promoted to a lieutenant-colonelcy. Mr. Herd has had wide experience in coal-mining in Scotland and South Wales, and during his service with the Dominion Companies has ben successively in charge of operations at the Springhill Mines, and at the ironstone mines at Wabana, Newfoundland. Mr. Herd's experience in undersea mining is very extensive, and he has also had acquaintance in the mining simultaneously or in close succession of coal-seams separated by a thin layer of measures. The problems connected with undersea mining and with the extraction of closely-superimposed coal-seams separated by a thin layer of measures. The problems connected with undersea mining and with the extraction of closely-superimposed coal-seams are prominent in the areas of the Dominion Coal Company, and in this regard, as in other ways, Mr. Herd is well qualified for his new position.

Acadia Coal Co.—This company has the distinction of being perhaps the only coal producer in Nova Scotia to show an increase in its output for the first half of the year. The production for the first six months of 1919 was 190,000 tons, about, which compares with 111,063 in the first half of 1918. The present rate of production does not, however, represent full-time work for this companies collieries, and the difference in favour of 1919 is due chiefly to the explosion in the Allan Shaft Mine, which disorganized production in the first half of 1918.

Intercolonial Coal Company.—The output of this company for the first half of the year was about 90,000 tons, which compares with 102.14 8tons in the corresponding period of 1918.

Nova Scotia Steel & Coal Co.—Production at this company's collieries closely approached that of the first half of 1918, being 245,000 tons for the current year, against 257,788 last year. Some irregularity in work may be expected in the near future during the continuance of the shut-down of the Steel plant at Sydney mines. Production at the collieries of Scotia has been very good recently, the output on one day in June reaching 2,522 tons.

Inverness Coal & Railway Co.—The production of Inverness mines was for the first half of 1919 about 69,000 tons, comparing with 108,282 tons in the first six months of 1918. Mr. John McGillivary, who has for a number of years been in charge of the operations of the mine and railway at Inverness, and who latterly has been acting at General Manager and Receiver, has resigned, and has been appointed to a position with the Canadian National Railways at Toronto. Mr. McGillivary has been a careful operator, and has kept the Inverness Colliery and Railway in operation under some exceptionally adverse conditions. Recently the Eastern Trust Company applied for permission to foreclose the mortgage on the properties, and in the meantime, negotiations have been proceeding between the Federal Minister of Railways and the Commissioner of Mines of Nova Scotia. It is now announced that the Government will take over the railroad on the same basis on which other roads in Nova Scotia have been taken over, and that a weekly order for 1,800 tons of coal for the National Railways is to be given to avoid the closing-down of the mine.

The aggregate production of the Nova Scotia collieries for the first half of 1919 is not exactly ascertainable, but is in the vicinity of 2,450,000 tons, and is about 150,000 tons below the production of the first half of 1918. From present indications and the known prospect of the future it would seem that the production for 1919 cannot exceed from 4¾ million to 5 million tons. The impression obtains that improved demand for coal will present itself about September. It is really more a matter of transportation than demand, however, and if the Dominion Coal Company can obtain release of its steamers, and can secure sufficient tonnage at freight rates which will permit of carrying coal to Montreal at saleable prices, then the pressure on the smaller companies will lessen, and business will revive locally.

The disinclination of the Board of the National Railways to pay the price for coal that the cost of production in Nova Scotia at the present time requires has been the subject of very vigorous resolutions by the miners' unions, and, in response, some unusually straight talk is being ascribed to the railway officials in semi-offcial communications emanating from Ottawa and appearing in the newspapers. The railway people say "we are running the railways as a business proposition, and, in competition with other railways, must buy coal in the cheapest market." Many considerations are involved in this statement, and for one thing it clearly discloses the difficulty which besets men who endeavour to run a state-controlled enterprise on business lines. It is doubtful whether in a country which has in the past approved of political patronage, and in which a quid pro quo has been the normal accompaniment of electoral approval, it is possible to do any such thing. Much more vital considerations, however, are involved in any matter that concerns the coal production of Canada at this time, conditions which may properly over-ride the question of price. Price is probably the least consideration in connection with coal production to-day, chiefly because no one really knows just what a dollar is worth. One thing is sufficiently clear, namely, that a Canadian dollar will not purchase a dollar's worth of United States products to-day, and every cent that is ex-

pended outside of our own borders unnecessarily increases the Canadian disadvantage.

The semi-official communication from Ottawa referred to states further:

It is doubtful if the decrease in output of the Cape Breton mines is at all due to decrease in coal supplied the Government railways. In the Capital, it is believed it is due entirely to labor unrest, which has had a deterrent effect on industrial progress and on the building trade. Sydney coal troubles are the direct effect of the attitude of labor throughout Canada. Owing to the unrest, the building programme projected in Canada last spring has been reduced by sixty per cent., and individuals and corporations refuse to increase plants or take extensive orders, owing to the uncertainty of the labor supply.

The situation in Sydney is viewed here as an indication of what may be expected in other centres this autumn and the coming winter. It is felt that the penalty must be paid for the unrest this summer throughout Canada and for the lack of thrift during the period of high wages and constant employment.

Presumably this is Ottawa's retort to the resolutions stated to have been passed by representatives of the miners in Sydney, protesting against the action of the Government in arresting the Winnipeg strike leaders, and practicaly asking for the confiscation of capital. The statement is not characterised by restraint, and to say that Sydney coal troubles "are the direct effect of the attitude of labour throughout Canada" is to mix a modicum of truth with a great deal of error. A statement by the local representative in the House of Assembly gives with exactness the specific causes for the slackness of work in the Cape Breton collieries at the present time. Mr. D. A. Cameron, M.P.P., stated that the following causes were responsible, namely:

Requisition by the Imperial Government of ships which were formerly engaged in the St. Lawrence trade. Even if ships are obtained for the St. Lawrence trade again, freight rates would be prohibitive unless the pre-war charters were held to. A second is the increase of freight rates which has been made by the C. N. R. The third factor, Mr. Cameron said, is that the cost of coal at the pit mouth in Nova Scotia exceeded the cost of American coal delivered as far east as Montreal, and probably as far east as Campbellton, N.B.

Mr. Cameron might have added that the increase of freight rates on the Canadian National Railways is a direct result of the increased cost of coal production.

MONTAGUE GOLD MINING CO., NOVA SCOTIA, MAKING STEADY PROGRESS.

Mr. E. S. Romilly Smith, General Manager of the Montague Gold Mining Co., brought from Montague recently some wonderfully fine specimens of gold quartz from the company's property, specimens which reminded those who saw them at the office of the old days of the Annand and Rose properties, both of which mines are now included in the Montague Company's holdings of about a mile and a half square in extent. The specimens show gold jutting out all over them, and include a fine nugget. The company has spent the past twelve months developing and has cut five new leads on the 300 foot level, having now sufficient ore blocked out to keep the ten stamp mills continuously working for about twelve months approximately. If it were not for the set back experienced at the mines through the explosion of December, 1917, which smashed up the mill and machinery, work would have been in fuller swing now, as a result of the great and successful development. The company has now control of practically the whole Montague gold district for about eight years.

Mr. Smith is leaving on the Olympic on the 15th for England on a business trip, and will return in October, bringing his family to Montague with him, they having been unable to come to Canada during the war operations. While in England he will arrange for the installation of a new stamp mill and other machinery necessary to meet the requirements and bring the plant right up to date, the property having been thoroughly proven after having been worked five years by the company. In the meantime there will be no let up in work at the mines, but the present plant will be used to capacity pending installation of the new machinery. The new plant will include probably a ten stamp crusher of 1,600 to 2,000 pounds stamps as preliminary crushers, and Huntington mills will complete it with Wilfley tables and five vanners for salines, etc.

The company has ever been thoughtful of its employees at Montague, and a noticeable feature has been supplying the families with houses free of cost. They are now contemplating erection of a number of cottages and a boarding house for their employees.

Mr. A. Gerhardie, who has been associated with Mr. Smith in the mining management, has been appointed mine manager, and under his direction, he being a good mining man of much experience in different parts of the world, including South Africa, it is expected continued rapid progress will be made both in development and output during Mr. Smith's absence.

The company opened their mining operatons at Montague on the Seymour Kaye property, and have since acquired adjoining properties. Their miners are still working below the "break," and are in virgin soil. Montague is one of the few gold mining districts in Nova Scotia that has come back strong, and the depth at which the Montague Company's operations have located such good paying ore would seem silent testimony as to the great possibilities of deep mining.

The company has recently acquired the whole of the Roderick McDonald areas, adjacent to its own, and now has virtually all the great properties in the Montague gold district.—Halifax "Chronicle."

It is reported that a rich lead of manganese was discovered at the New Ross Mine recently. The new lead was located but a few feet from the surface, and is said to be oen of the very finest quality.

REPORTED DISCOVERY OF OIL ON VANCOUVER ISLAND.

(From our British Columbia Correspondent.)

Oil is said to have been discovered on the west coast of Vancouver Island, petroleum records having been registered in the name of David Logan, a lineman in the employ of the Dominion Telegraph Service, with residence at Clo-oose. Mr. Logan states that he has found large seepages and has taken some samples to the town of Port Alberni for assay.

Special Correspondence

BRITISH COLUMBIA.

May Coal Production.

The output of the coal mines of British Columbia for the month of May was 187,726 tons made up as follows:

Vancouver Island.

	Tons.
Western Fuel Company, Nanaimo Collieries...	48,012
Canadian Collieries (D), Ltd., Comox Collieries.	44,297
Canadian Collieries (D), Ltd., Extension Collieries	20,068
Canadian Collieries (D), Ltd., So. Wellington Collieries	7,783
Pacific Coast Coal Mines, Ltd., Morden Colliery.	6,170
B. C. Coal Mining Co., East Wellington	1,508
Nanoose Collieries, Ltd., Grant Colliery	397
Granby Consolidated M. S. & P. Co., Cassidy	6,887
	135,122

Crow's Nest Pass Collieries.

Crow's Nest Pass Coal Company, Coal Creek Colliery	26,064
Crow's Nest Pass Coal Company, Michel Colliery	14,024
Corbin Coal & Coke Co., Corbin Colliery	4,287
	44,375

Nicola-Princeton District.

	Tons.
Middlesboro Colliery	3,108
Fleming Coal Co.	2,649
Merritt Colliery	771
Coalmont Colliery	706
Princeton Colliery	1,095
	8,229

Coal for the new bye-product ovens of the Granby Consolidated at Anyox, B.C., is being supplied from the Cassidy Collieries, Vancouver Island, where a new mine has been opened, a modern plant installed, and provision made for the housing of employees in a manner never before undertaken on the Pacific Coast. Cassidy's is considered an ideal coal mining centre and its output is constantly increasing.

Groundhog Coal Fields, Northern B.C.

The revival of interest in metalliferous mining throughout the Portland Canal District, northern British Columbia, has directed attention again to the Groundhog Coal Fields, as they are coloquially termed. These fields are situated about 90 miles from the mining town of Stewart and the coal, judging from the available reports, is of the highest quality and very plentiful. To open up the field found railroad construction would be necessary and in this connection three feasible routes are being discussed. The shortest would be from tidewater up the Naas River, but it from which point a railroad has been built fifteen miles in the direction of the coal fields. Another route would be from tiewwater up the Naas River, but it is pointed out that this would be eighty miles longer. As against the handicap of distance, however, there would be less rockwork and an easier grade. A third possible route is from the G. T. P. Railway at Hazelton, about 150 miles southward. The Groundhog Coalfields have been reported upon by a number of engineers and are known to extend some seventy miles, the strip being over thirty miles wide over which coal outcrops in different places.

Wellington and Canadian Collieries vs. Pacific Coast.

The action of the Wellington Colliery Co., Ltd., and Canadian Collieries (Dunsmuir), Ltd., vs. Pacific Coast Coal Mines, Ltd., has been before the British Columbia Court of Appeal. In the lower Court Mr. Justice Murphy found for the plaintiff whom he allowed $84,000 damages for trespass in taking coal from the property of the Wellington Collieries and the Canadian Collieries. It may be explained that the properties of the respective companies are situated on Vancouver Island and are adjacent to each other. The defence was that W. Coulson, late manager for the Pacific Coast Coal Mines, Ltd., and now deceased, had given permission for the so-called trespass and for the taking from the plaintiff's property of a certain amount of coal. After hearing argument the Court of Appeal reserved its judgment.

Robert Henderson, fire boss at the Harewood Mine, Canadian Western Fuel Company, has been appointed manager of that mine, vice-president Richard Batty, resigned. Mr. Henderson formerly was manager at No. 4 mine, Canadian Collieries (Dunsmuir), Ltd., Cumberland.

Grand Forks Smelter & Phoenix Mine Closed Down.

The Granby Consolidated Mining, Smelting and Power Co., Ltd., has discontinued operations at its Grand Forks Smelter and Phoenix mine, and it is believed that the close down is permanent. The immediate cause is lack of coke owing to the strike in the Fernie coal fields. It had been the intention of the company to continue operations until the fall at least so that the trouble at Fernie has only hastened what was looked upon as inevitable. The company is offering all employees at Grand Forks and Phoenix free transportation to Anyox and positions with the company at that place. Among the Phoenix miners and business men there is a persistent feeling that Phoenix will rise again from its Granby ashes. It is pointed out that while the camp is closed the machinery is not being removed, the only exception being that of a few ore crushers. While the Great Northern Railway will pull up its tracks, the C. P. R. it is pointed out will not do so. Attention in this connection is directed to the report of the Granby Company of last June, which states that there were then 3,274,966 tons of ore remaining in the Phoenix mine. Since that time it is estimated that about 150,000 tons have been mined and smelted. On that figuring, therefore, there are about 3,000,000 tons still left. This, with the possibility of new development inclines those with confidence in the camp to the belief that the Consolidated Mining and Smelting Company of Canada is likely to step into the breach and to continue mining operations in the district.

Anyox Smelter Expects Great Increase in Copper Production.

That the Anyox Smelter of the Granby Mining and Smelting Company will produce twice the amount of

copper that has been turned out heretofore and may ultimately produce 100,000,000 pounds a year, is a statement credited to Dr. M. E. Nichols, President of the Company, on returning from a recent visit to Anyox. The optimism of President Nichols is believed to indicate the development of satisfactory conditions in some of the properties acquired recently among which is a group on Oxtall River, B.C., held under bond. The ledge on the Oxtall is said to be enormous. It is being developed by diamond drilling this year.

Consolidated Mining and Smelting Buy Claims in Sibola Country.

The Consolidated Mining and Smelting Company has bought five groups of claims in the Sibola country, situated twenty miles north of Sibola mountains and one hundred miles from the Grand Trunk Pacific Railway, and both silver-lead ore and silver-copper ore have been found on the property. The consideration is said to be in the neighborhood of $250,000.

Activity in the Alice Arm District.

There is much mining activity in the Alice Arm District, Northern British Columbia. The Taylor Engineering Company, which has taken over the mine and railroad of the Dolly Varden Mining Company, is engaged in preparing to put the mine on a shipping basis. The two miles of railroad necessary to complete the line from tidewater to the Dolly Varden mines is being rushed to completion. Owners of other mining companies in the vicinity also are busy. Both the North Star mine and the United Metals mine have ore ready for shipment as soon as transportation facilities permit it being moved. Reports received from the north indicate that a consolidation of mining properties is likely to be effected. W. R. Tonkin and W. W. Warren, representing United States capital and John Peterson of Stewart, are reported to have bonded the North Star, the Vanguard, the Last Chance and the Second Thought. It is said that about half a million dollars is involved in this transaction. W. Somerville has bonded the Homestake mine and the Musketeer has been bonded by L. Meekin. A working option on the Ruby mine, situated opposite the Dolly Varden has been taken by the Taylor Mining Company, a subsidiary concern to the Taylor Engineering Company. The Temiskaming Mining Company of Cobalt, Ontario, from all accounts, is still interested in the District and is likely to take over the Moose group.

NORTHERN ONTARIO.

Kirkland Lake District.

The feeling is getting abroad that at least some of the mines in the Kirkland Lake camp may soon begin to employ a limited number of men, preparatory to once more starting operations at the same rate of pay and under the conditions which prevailed before the labor strike was called. A number of the men have signified their willingness to return to work on the old basis.

A reconsideration of the entire situation, viewing the economic side of the question as it applies to precious-metal mining, may with reason serve to bring about a change in the attitude of the mine workers, and the possibilities of an early resumption of work in the Kirkland Lake field is decidedly more promising than at any previous time since the declaration of the strike.

The strike has caused more or less inconvenience in cases where property is held under working option and where the option agreements do not protect the purchasers in case of enforced curtailment due to labor strikes. As long as the strike continues only three courses are left. The purchaser must either seek an extension of time covering the duration of the strike, failing which he will be obliged to either abandon the option or meet the obligations incurred without the opportunity of carrying out the proposed work of exploration. The latter course, in the majority of cases, would be very improbable. Indeed, in some cases, would be impossible, especially where the agreement specified the amount of work to be done each month. Among the properties affected by this phase of the situation is the Ontario-Kirkland, which is held under working option by the Crown Reserve Mining Company of Cobalt.

Mill heads at the Kirkland Lake Gold Mines during the two and a half months of operation prior to the labor strike, were comparatively low, according to information received from a usually well-informed source.

In a recent interview, Frank L. Culver, president of the company, refused to commit himself to any statement with regard to the average grade of the ore as so far determined. However, unofficial reports indicate an average gold recovery of a little under $5 to the ton.

From definite statements made by Mr. Culver concerning ore at depth, and the general physical condition of the mine, the result of future mill operation should be decidedly more satisfactory.

The Bush Fires.

Bush fires throughout the north which had gained threatening proportions during first three days of July, and had resulted in the destruction of the mining and milling plant of the Patricia Syndicate at Boston Creek, were subdued somewhat by rains which began to fall on the morning of July 4th. At the time of writing, these fires have died down.

The destruction of the mining plant and mill of the Patricia Syndicate at Boston Creek was the only mining plant lost as a result of the forest fires which broke out in various parts of the north early in July. The mill had been closed down for some time. It had a rated capacity for treating about 30 tons of ore daily, and is stated to have had a value of about $70,000.

Reports were in circulation with regard to the mill of the Dome Lake being destroyed, but this report was erroneous, the plant never being even threatened with bush fires. Late in June a small fire broke out in the pump-house, and did some damage, and it would appear that from this the other more serious reports took their root.

Misrepresentation re West Shining Free Gold Area.

Resentment is being openly expressed by mining engineers and geologists at the fact that promoters of unproven prospects in the West Shining Tree gold area are using the names of these men in connection with promotion literature that is in some instances at once misleading and incorrect.

It is freely admitted that the favorable geological conditions, and the rich patches of ore found in more or less narrow pay-streaks in the veins so far opened up, lend to the district a considerable amount of prospective merit. Beyond this no man can venture a definite statement.

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Maker	Size	Description	Dia., Driver	No. Wheels	Wheel Base	Weight	Length Overall
2 Porter	7″ x 12″	Simple	23″	4	4′0″	14000	13′4″
4 Porter	10½″ x 14″	”	26″	4	5′3″	30000	19′4″
2 Porter	7″ x 14″	”	24″	4	5′3″	20000	18′0″
1 Baldwin	11″ x 14″	”	28″	6	6′6″	40000	22′8″
1 Baldwin	11″ x 14″	”	28″	6	6′5″	34000	19′8″
1 Baldwin	9″ x 14″	”	28″	4	5′6″	25000	17′0″

These locomotives are 3 ft. gauge and have a clearance height from top of rail of 4 ft. to 5 ft. 2 in. This machinery is all in working order and is open to inspection at Glace Bay.

DOMINION COAL COMPANY Limited, Glace Bay, N.S.

GENERAL MINING NOTES.

The Rio Tinto group of claims, which are situated on the same vein as the Electric Point Mine at North Port Washington, has been sold by J. H. McDonald, of Rossland, to American capitalists. Recent development work on this property has revealed a considerable body of first-class silver-lead ore. The vein strikes east and west and has been opened up by a series of open cross-cuts over a distance of six thousand feet. It is understood that the new company will proceed with development on a large scale.

Extensive development work is planned on the Whitewater and Comstock groups of mineral claims on Cascade Creek in the Lardo District, and on the Nonpariel Group at Zincton. These properties belong to the Nelson Mining and Development Company, Spokane. W. W. Shaffner, general manager, has returned to Nelson, after a trip of inspection on which he was accompanied by Clarence Marsh, secretary-treasurer of the company, W. Euler of Soap Lake, Washington, and A. L. Maltbie, of Wenatchee.

They put some men to work continuing No. 2 tunnel at the Cascade Creek Mine. This tunnel has already been driven 120 feet and it is estimated that another seventy or eighty feet will strike the main ore body. The ore is silver, lead and gold. The nonpareil group is in the immediate vicinity of the Lucky Jim Mine, and is considered to be a prospect of much promise.

The Mansfield Mining Company is developing what is known as the Crescent group of mineral claims situated in the Alpine Bas near Trout Lake. The main vein was first tested by a shaft which showed up so well that it was decided to drive a tunnel to strike the ore at a considerable depth. This tunnel has been driven some 185 feet with satisfactory results. The company proposes driving a second tunnel for a depth of 450 feet on the ore body. The ore is silver-lead, running thirty to fifty ounces of silver and seventy per-cent lead. When development has advanced sufficiently it is the intention to erect a Gibson concentrator. Another promising property of the Trout Lake district is the Tribune Mine, which carries high values in silver. Development of the new body of ore which was worked to some extent last season will be continued this summer. The Crown property which is located above Trout Lake has been bonded by California mining men who are said to propose the erection of a mill this year.

Mining development is progressing energetically in the Salmon River Valley, Portland Canal District. At the well-known Premier mine an assay office is being built and accommodation provided for a considerable force of miners. A portable saw-mill already has started work and a road gang is engaged in putting the road in shape for heavy hauling. Similar operations are under way on the property of the Bush Mines, Ltd.

"Sirocco"

TRADE MARK

VENTILATION— Does It Pay?

In order to maintain the maximum production, with a corresponding high standard in the quality of the work, it is absolutely necessary that every working place should have a good working atmosphere, and that the ventilation should be so kept up with the progress of the work that the men may continue to perform their duties in health and comfort. Mechanical ventilating systems which have been designed with careful study and are now in operation have fully justified the cost of their installation, as evidenced by the increase in tons per man per shift and the decrease in cost. In mines where such a system has been carefully worked out and conditions have been standardized as much as possible, there has always been a great saving in the amount of compressed air used. In fact, in some cases the economy in this item alone has more than balanced the cost of installation.

The accompanying extract and chart are from **"Standardization of Mining Methods"** by Charles A. Mitke, Engineering and Mining Journal, Nov. 30, 1918, and answer most conclusively the question, does it pay?

He says, among other things, **"in some cases the economy in this item alone, (compressed air saving)** has more than balanced the cost of installation."

His charts of actual performances where mechanical ventilation has been installed show that after installation the output per man per shift was more than doubled; and the cost was cut to LESS THAN HALF.

Compressed air savings more than balance the cost of installation; your output is doubled; your costs cut in half. All these indicate there is something worth while investigating. SIROCCO fans are extra efficient in forcing large volumes of air through the tortuous and restricted passage-ways of the average mine.

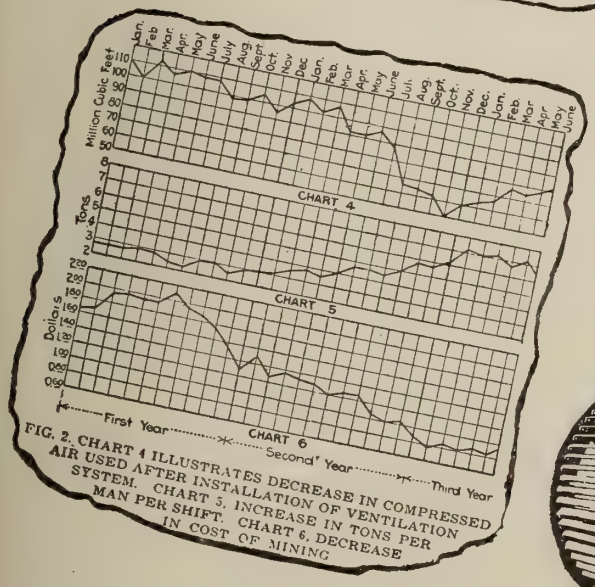
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June Jul. Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June
Million Cubic Feet
110 100 90 80 70 60 50
CHART 4
Tons
8 7 6 5 4 3 2
CHART 5
Dollars
220 200 180 160 140 120 100 080 060 040
CHART 6
First Year
Second Year
Third Year

FIG. 2. CHART 4 ILLUSTRATES DECREASE IN COMPRESSED AIR USED AFTER INSTALLATION OF VENTILATION SYSTEM. CHART 5, INCREASE IN TONS PER MAN PER SHIFT. CHART 6, DECREASE IN COST OF MINING.

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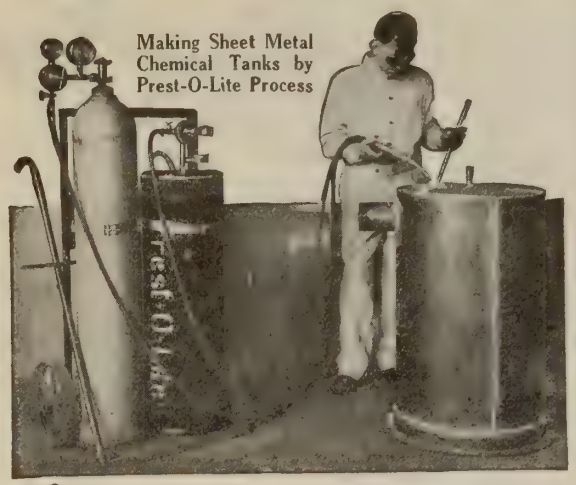

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The Bowena Copper Co. holds under license 3 claims of 150 acres each on the east side of Bowen island, 12 miles west of Vancouver. Development consists of 300 ft. of tunnelling, 50 ft. shaft work, and numerous open cuts. The ore contains about 2 per cent. copper and small values in gold and silver. A concentrating mill is practically completed and ready for milling operations.

The Bowena Copper Mines, Bowen Island, B.C.

The company is capitalized at $300,000 in $1 shares. There is outstanding 27,0820 shares. There has been expended on development and equipment $30,000.

The officers are: L. A. Brown, president; T. W. Turner, vice-president, and C. M. Oliver, secretary-treasurer.

The annual meeting was held in March, 1919. Alex. Sharp reports ten to twelve thousand tons ore blocked out, containing about 1.8 per cent. copper

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Corundum, Limited, a newly incorporated company, capitalized at $250,000, was recently organized by E. B. Clark, formerly manager for the Manufacturers' Corundum Co., at Craigmont, Ont., from 1907 to 1918, for the concentrating of corundum ores. Control of the properties of The Manufacturers Corundum Co. was secured and a concentrating mill of at least 100 tons per day capacity is now being constructed at Craigmont, Ontario. Large burning engines are being installed and the mill will be equipped and 16 Wilfleys, classifiers, Hardinge ball mill and other modern machinery. Mr. W. W. Hudson, re-recently with The General Engineering Co. of Salt Lake City, is engineer in charge of construction. G. H. Ferguson, of Renfrew, is President of the new company, and E. B. Clark, of Craigmont, is Vice-President and Managing Director.

POSITION WANTED—Mining Engineer, 15 years' experience all kinds metal mines, 12 years Superintendent, Manager and Examination. College Graduate. Member C. M. I. Apply A, Canadian Mining Journal.

:-: EDITORIAL :-:

THE VINDICATION OF SELF-CONTAINED BREATHING-APPARATUS BY USE UNDER WAR CONDITIONS.

There has been a significant coincidence in the attention given at practically all annual meetings of mining societies held since the conclusion of fighting on the western front to the part played by tunnelling corps in sapping and mining operations, and the papers and discussions at these meetings, both on this side of the Atlantic and in Britain, have disclosed the great extent to which use was made of self-contained breathing-apparatus, chiefly of the oxygen cylinder type, and the reliability shown by these devices under the strenuous conditions of war service.

We reproduce in this issue a paper read before a recent meeting of the Western Branch of the Canadian Mining Institute, which deals largely with the standard-type "Gibbs" apparatus which has been developed under the supervision of the United States Bureau of Mines. It is interesting to know that a composite apparatus of similar excellence is a likelihood of the near future in Great Britain.

Speaking to a discussion on Colonel Dale Logan's paper on "The difficulties and dangers of mine-rescue work on the Western Front, and mining operations carried out by men wearing rescue-apparatus" at the Annual Meeting of the Institution of Mining Engineers in London, Sir W. E. Garforth referred to experimental work which had been carried on in England, and forecasted that in another twelve months, with the help of the Home Office Committe, which he believed was quietly doing valuable work, he thought we should have the apparatus which many had been looking forward to for the last thirty or forty years.

On a number of occasions the "Journal" has advocated that some central governmental authority should undertake to do what is now apparently near completion, namely to devise a breathing-apparatus which should avoid the disclosed dangers of the existing types, and should combine the admitted excellences of these types. The British Home Office, when it enforced the compulsory provision of rescue-apparatus at collieries, became morally responsible for the provision of an approved type of apparatus, and we presume that, but for the interruption of the war, some effort of this kind would have been undertaken ere now. When the war had commenced it speedily became aparent that oxygen breathing aparatus would be used on a scale and under conditions of test that would yield far more important experimental results than could be obtained in many generations of peace-time research, and it would appear as if those who had anticipated interesting and valuable disclosures regarding the war-time evolation of self-contained breathing-apparatus are not to be disappointed.

One other important result of the work of the tunnelling corps is the number of trained and resourceful wearers of breathing-apparatus that will return to employment in mining.

One opinion of Colonel Logan will be agreed in by all who have in any way to do with mine rescue-work. This gallant officer said: "We never found a man refuse to go down, but some of the men were quite incapable of carrying on the work of rescue. The ruthless exclusion of men physically or temperamently unfitted for the work was necessary." The specialised nature of mine rescue-work, and the unsuitability of untrained men, combined with a proper sense of the limitations of breathing aparatus, are first considerations, and in their neglect is to be found the foundation of most of the bad things that have been said about the use of these devices.

PRESIDENTIAL ADDRESS, INSTITUTION OF MINING & METALLURGY.

We reproduce in this issue the full text of an address given before the Institution of Mining & Metallurgy in London by Hugh K. Picard. The comprehensive survey of recent metallurgical progress which provides the subject of Mr. Picard's remarks shows how extensive and specialised a science the recovery and refining of metals has become. Mr. Picard's address touches chiefly on the metallurgy of zinc, lead, silver, copper and gold. The references to the metallurgy of iron and steel are few, notwithstanding the great financial importance of this industry and the prominent part it plays in the literature of technical societies, and we believe the wide range of metallurgical subjects reviewed, with scarcely a mention of the technique of underground mining operations, is a fair indication of the importance of modern metallurgy, and of the wisdom of recognizing the fact by including metallurgists by name in the titles of mining societies. The average mining engineer canot hope to become a metallurgical specialist, nor is it required of a metallurgist that he should acquire all the mysteries of the miner's art as practised underground.

We believe the change of the name of the American Institute of Mining & Metallurgy was an overdue recognition of the growing importance of the metallurgist, and, if the Canadian Mining Institute should decide to also change its name so as to more adequately expres

the composition of its membership, the decision of the members will be as time goes on recognized as a just and proper one.

CORRESPONDENCE.

Kirkland Lake, Ont.
July 14, 1919.

The Editor,
The "Northern Miner."
Dear Sir,—

A lengthy and entirely misleading statement has recently appeared in the press purporting to put forward the miner's side of the Kirkland Lake strike, and as the actual facts have never been published, I am directed to lay these before you and correct some of the erroneous statements referred to in the public interest. Many hard working and contented men earning good wages have been victimized by the tyrrany of the local union and are suffering in common with the whole mining industry on this new and promising gold field; it is no doubt in an endeavour to placate these victims who are showing signs of active opposition to the extreme agitators who engineered this ill-starred strike.

The statement referred to says in effect:—

(1) That the state of unrest was caused by the increased cost of living—the fact is that the vast majority of the men were boarded and housed for $1.00 per day by the Companies regardless of the cost of commodities; and Union officials specifically stated that "Recognition of the Union" was the real bone of contention. Wages, so far as remaining stationary as alleged, showed a continuous rising tendency.

(2) That the District Union endorsed the wage scale demanded by the Local Union. Did the District Union, however, endorse the demand for Saturday afternoon holidays with full pay; the discharge of all non-union men; $135.00 a month and room and board for cooks; and the other demands of which no mention is made?

(3) That the recent meeting was unanimous to go back to work—(if and when it can be provided, it should have added)—pending the award of a Board of Conciliation, and expressed its willingness to abide by the decision of the Board—This meeting was a frame-up as the result of a meeting held just beforehand in the Union Hall. The proviso is carefully suppressed, "That the decision of such a Board must however be unanimous," or in other words in agreement with the Union nominee on the Board; in fact a pure farce.

(4) That the men are taking a firm stand not to accept anything but the wages demanded by them—If this is true it is no wonder that they made the proviso (suppressed), in the previous paragraph, but the fact is that numbers of men would gladly go back to work if there was any going; meanwhile many are working on the road at much less than they earned at the mines.

(5) That the men are always willing to negotiate—their whole statement shows that the Mine Managers have always been perfectly willing to negotiate too with their own men collectively. The manager will not, however, negotiate with a Union which is definitely proved to have Bolshevik influence back of it.

(6) That any mines working are doing so with the full sanction of the Union—this is wholly untrue, and we defy the Union to name any such mine in Kirkland Lake.

The simple facts are that this strike has been brought about by a number of men, many of whom are notorious agitators and draft-evaders, by the preaching of rank treason, rebellion, revolution, and sedition and terrorism of the most pernicious kind, which prevents men who want to earn decent livings from doing so. Some samples of the printed literature posted up in a mine building will give some idea though a very slender one, of what kind of poison has been at work—"The New Morality" says, "Damn interest, Damn rent, Damn profits, Damn agreements.

"We've damned well enough to do to look after ourselves and families.

"The power must be taken out of the policeman's club.

"How? Anyhow.

"Why? Because it hurts our class and is therefore immoral.

"The guns mustn't point our way if they aren't spiked, because they are liable to go off and hurt us, and that would be immoral. So we must spike the guns or turn them around.

"Strike when the boss has a big order which he must fulfil. It will hurt him more and us less, and that is moral. Tie up the industries in town, all the industries in all the towns, in the whole country, or in the whole world if necessary."

Bolshevik influence is at the head of the local Union, and we defy the Union to deny it. that is a deliberate statement and we hold the proof. It has proved that it is uncontrolled by the Headquarters of the Union by its action in calling this admittedly illegal strike which has entailed heavy loss on the whole community, and the mines will certainly not attempt to restart operations until the issue has been disposed of as to whether Bolshevism or decently organized and controlled labor is to hold sway in the field.

Yours truly,
KIRKLAND LAKE MINE MANAGERS ASSOCIATION.
J. E. Grant, Secretary.

HIS MAJESTY THE MINER.

How is his majesty, the coal miner, this morning? Most fervently do we hope that he slept well and awakened kindly disposed towards his humble subjects, the people of the Commonwealth. To him we make obeisance, and express the hope that he spent an enjoyable week-end — that he had a good day at the races, that he was lucky at his fishing, his cards, and his love-making; that his vegetable garden flourished, that his fowls laid many eggs, and that the beer was good; in short, that he rejoiced in whatever he did. His majesty, the coal miner, has made his periodical toll upon his subjects, and we loyally, and resignedly, proceed to pay it at the behest of the Government through which his majesty rules the people. We, therefore, trust that his majesty is now in a contented frame of mind, that he shows no signs of unrest, lest he should make a further toll upon his subjects. His well-being is of so much importance that everything we can do to promote it will be done right willingly.—The "Australasian" by way of Rossland "Saturday Night Miner."

Development and Improvement of Breathing Apparatus

By H. H. SANDERSON.

(Read before Western Branch, C. M. Inst., Nanaimo, June 4th and 5th, 1919.)*

Self-contained breathing-apparatus, more often called, "rescue-apparatus," is designed for the purpose of saving live and property when endangered by fire, smoke, fire damp or other poisonous gases, either above or below ground. The portable apparatus is one which enables the wearer to penetrate the irrespirable gases without being supplied with air from any outside source. It is therefore essential that such apparatus should provide the wearer in these circumstances, with good air, by continuously rendering the exhaled air fit for reinhalation, that is to say, it must be provided with means for renewing the consumed oxygen in a continuous manner and in sufficient amount, besides making harmless the carbon-dioxide produced in the lungs. At the same time the apparatus must not form a hindrance in the performance of work.

Breathing-apparatus of the self-contained type was first introduced into the United States in 1907, following which the Proto, Draeger and Westfalia apparatus were installed at various mines and plants throughout the United States and Canada. The Proto apparatus was manufactured in England, while the latter types came from Germany. Little change has been made in the Proto apparatus up to the present time, although several more or less important improvements have been made on the Draeger. The Westfalia did not meet with great success, and the sale of this type was soon abandoned.

Importation of these types of apparatus continued until 1914, when it became necessary for the American representatives to manufacture for themselves. Considerable difficulty was experienced in this work for some time. Investigations conducted by the United States Bureau of Mines demonstrated very forcibly that there was considerable room for improvement in the various types of European made apparatus, and the work was commenced by the various engineers, physiologists and chemists of the Bureau of Mines for the development of an improved type of oxygen breathing-apparatus which will be referred to later in this paper.

Before taking up the question of improvements on the various types of apparatus let us look for a few minutes at the principal defects in the three types previously mentioned. In January, 1917, the United States Bureau of Mines published Technical Paper No. 82, written by Yandell Henderson and James W. Paul. The purpose of this publication, or report, was to supply information regarding the relative merits and defects of the various types of apparatus then in use. With this in mind I trust that I may be pardoned if I quote from this report, for I feel that after the thorough investigation which these men made, no one is better qualified to present this matter to the public, and so in pointing out the limitations of the apparatus in use in 1917, I will use their report.

*Reprinted from the Canadian Mining Institute Bulletin for July, 1919.

In developing self-contained breathing-apparatus the real problem is not only to make an efficient and reliable device, but also to fit it to the peculiar and varying needs of the wearer. It is important if a man is to wear breathing-apparatus for even a few minutes, and essential if he is to depend on it to keep him alive for several hours, and do also considerable work, that the condition in his lungs should be essentially similar to those when breathing normal air. The apparatus must adjust itself to the respiratory needs of the wearer, and also to wide variations in these needs. Until recently, however, the wearer has been expected to adjust his breathing to the apparatus. To forget, or fail to do this even for a few minutes, might cause his death.

One of the principal defects of former types of rescue apparatus as usually arranged, was that the oxygen supply was set at a fixed amount per minute, and that this amount, although more than sufficient to cover the requirements of the wearer while resting, was quite insufficient to allow him to make vigorous physical exertion.

Oxygen is often spoken of as a food. In one sense this is correct, but the demand for oxygen differs from the demand for food in the fact that the supply of oxygen must be continuous. A man may go without eating for several days, and still be able to do considerable work. After being properly fed he may be none the worse for his experience. Conditions as regards the oxygen supply are far more peremptory. The amount that the body uses in any one minute it needs and must have within that minute, or at least during the next succeeding minute. Even a slight deficiency in oxygen impairs intelligence and judgment, and produces almost immediately a condition of intoxication or delirium, rendering the subject incapable of intelligent action and paralyzing the muscles so that he cannot stand or walk. If this deficiency is continued for even a few minutes serious and often permanent injury to the nervous system (or even death) results. These considerations have not heretofore been adequately taken into account.

This insidious effect of breathing air deficient in oxygen cannot be over-emphasized. The symptoms are in practically all respects identical to those of breathing carbon-monoxide, and in some respects resemble those of alcoholic intoxication. The peculiar danger in breathing such air lies in the fact that discretion and judgment are quickly impaired. Moreover, in many individuals, perhaps in most men, the breathing is at first so little affected that the man remains unwarned of his danger until his legs give way and he falls helpless.

Secondly in importance to a sufficient supply of oxygen is an efficient arrangement for absorbing from the air in the apparatus the carbon-dioxide that the wearer produces. One of the most important facts demonstrated by recent advances in physiology is that in normal men and animals, under ordinary conditions, the amount of breathing is principally regulated, not

by the oxygen consumption, but by the carbon-dioxide produced. For this reason it appears improbable that any apparatus for use in poisonous gases can ever be devised for use for more than a few minutes at a time with which the wearer will not do any rebreathing whatever. It is especially important, therefore, that the alkali should be so arranged as to absorb as completely as possible the carbon dioxide-exhaled by the subject into the bags before he again inspires the air.

In the former types of Draeger and in the Westfalia apparatus the expired air was drawn through the absorber and into the inspiratory bag by means of an injector through which the oxygen enters the circulation system. Natural circulation, that is, movement of air produced by the subject's breathing, as in the Fluess-Proto apparatus—is to be preferred to automatic circulation induced by an injector. One particular advantage of natural circulation is that if the wearer happens to become imprisoned in "bad air" he can make his oxygen supply last for many hours by turning off the fixed feed on the oxygen cylinder and using the by-pass at intervals to supply the relatively small oxygen consumption during rest hours. Otherwise the supply would run out at the end of two hours, and the man might lose his life. With apparatus of the automatic circulation type, such conservation of oxygen is impossible, for turning off the oxygen feed stops the absorption of carbon dioxide and makes the breathing much harder.

No subject in regard to rescue apparatus has been more debated than the use of the helmet. Many practical mining men insist that the helmet is advantageous in that it allows the wearer to speak more distinctly and to breathe through the nose, a more natural method of breathing than with the mouthpiece and nose clip. It necessitates the wearer's breathing into a "dead space" greater than the volume of an ordinary deep breath. The air that the wearer expires into this space he is obliged, in good part, to reinspire from it. The defects of the helmet are serious, but the greatest objection to its use is the danger of leakage. I am glad to say at this point that the officials of the British Columbia Government, realizing the inefficiency of the helmet, were among the first to install the mouth-breathing apparatus.

The importance of having all valves, tubing, and openings as large and as free from resistance as possible has not, until recently, been adequately appreciated either by the manufacturers or users of breathing apparatus. When one puts on any of the three types of apparatus previously mentioned, he finds that he can breathe quietly back and forth into the bags without noticable effort. Even if directed to breathe vigorously for a few seconds, most subjects declare that they feel no considerable resistance. If, however, the wearer is required to exert himself so vigorously as to induce heavy breathing, he finds a resistance so exceedingly annoying that it soon occupies his mind to the exclusion of everything else, and he is strongly tempted to tear off the apparatus.

Safety demands that when the water of an apparatus is surrounded by an atmosphere containing poisonous gasses there should be no leakage inward. With the injector type of apparatus it is particularly important that no negative pressure should occur at any point where the outside atmosphere may be drawn in. As formerly constructed the injector of the Draeger drew air through the absorber. In case the absorber or the tube leading to it was cracked, poisonous gasses could enter. A life has been lost in this way. This defect has been to a considerable extent remedied by so placing the injector of the Draeger apparatus that the air is forced through the absorber under a slight positive pressure. In any arrangement of this sort, however, there must always be a greater or less area of negative pressure on the side from which the injector draws. This is an additional reason for abolishing the artificial circulation and giving up the injector entirely. A natural circulation depending upon the respiratory movements of the wearer is altogether preferable.

It is an advantage to have a slight positive pressure in the apparatus, although it must of course not be of such amount as to impede the wearer's expiration — above 0.5 centimeter, or at most 1.0 centimeter, water gage. Even the best constructed apparatus is liable to leak slightly, and all leaks should be outward instead of inward. One of the principal reasons for recommending a greater supply of oxygen in the apparatus of the fixed-feed type is the fact that there will then be a continual slight leakage outward of the excess. On the other hand, when the supply is insufficient, and the breathing bags are sucked flat at each breath, the negative pressure so produced may draw in the surrounding poisonous atmosphere.

As regards joints and connections of these three types of apparatus, the Fluess excels both the Draeger and Westfalia. The many joints on the Draeger apparatus require careful inspection to insure their being made fast. Screws having a cross arm for turning admit of making the joint reasonably tight, but thumbscrews with a circular milled head are not so reliable, as a heavy glancing blow will often loosen them. Such screws have frequently been found loose both in training and in actual rescue work. In many instances loosening has been due to the metal part of the tube not having a locked seat so that a slight movement of the metal part has worked the screw loose.

The reducing valves of the former types of apparatus also were frequently a cause of trouble, as a result often of the deterioration of the rubber diaphragm. One of the most serious difficulties in the way of devising and constructing a reliable mine rescue apparatus is the necessity of using rubber. So called pure gum rubber remains soft and elastic in Europe for months, but in the dry and brilliant climate in which most of the American mines are located it becomes stiff and brittle in as many weeks. It appears at present impossible to avoid entirely the use of rubber, but it is evident that the parts composed of rubber should be as few as possible.

Impelled largely by the observations made by Doctors Henderson and Paul, the Bureau of Mines undertook to develop a breathing apparatus that should embody the recommendations of these men, and consequently in 1914 W. E. Gibbs, a mechanical engineer of experience and skill especially suited to the task, started, with their assistance, to design what is now known as the Gibbs apparatus.

Two years later, during a period while Mr. Paul was not connected with the Bureau of Mines, and while he was affiliated with Mr. Clarence Hall, who had previously left the Bureau of Mines service, Mr. Paul took out the patents on the details of construction of an oxygen breathing-apparatus which is now known as the Paul Apparatus.

Both the Gibbs and Paul apparatus have now been perfected, and placed on the market. The machines

show considerable improvement over the former types. In the first place the former type of fixed-flow reducing-valve has been replaced by a feed which delivers the oxygen to the wearer as it is required. The efficiency of the regenerating cartridge has been greatly increased, and the circulation throughout the apparatus is maintained at a practically normal rate.

The use of the helmet has been discontinued in favor of the mouthpiece, which is a decided improvement over former types of mouthpieces in that the breathing is much easier and the saliva is readily disposed of.

The danger of negative pressure has been eliminated and the outlet openings on the reducing valve of the Gibbs apparatus have been considerably enlarged. There are no rubber parts in or around the valve to deteriorate. The number of working parts and connections have been reduced to a minimum, and the use of rubber has been cut to the very smallest possible amount. Simplicity means safety. The weight on the Gibbs apparatus has also been reduced to 35 pounds.

Through an act of Congress, approved February 25th, 1918, the Bureau of Mines set about to establish a schedule for the official test and approval of breathing-apparatus. This schedule, known as No. 13, was first published in March of this year, and the Bureau is now engaged, at their testing station in Pittsburgh, in testing apparatus for approval. According to this schedule, No. 13, all breathing-apparatus which passes their test and requirements will carry an approval plate marked as follows:—

"Permissable Mine Rescue Breathing Apparatus U. S. Bureau of Mines. Approval No. ——"

In conclusion, let me say that never in the history of breathing apparatus in this country have there been such marked improvements as in the last 18 months. This has been brought about principally by the work of the Bureau of Mines and also by the urgent call received from General Pershing for 500 sets of Gibbs Apparatus for service in France, the Gibbs having already been perfected by the Bureau.

It is hoped that the possibility of having approved apparatus on the market in the near future will do much to increase the confidence of mining men in the use of such equipment, and also to stimulate interest in the training of men to wear the apparatus when the occasion demands.

CASSEL CYANIDE TO INCORPORATE CANADIAN COMPANY.

J. A. McRAE.

Official information has just been received that the Cassel Cyanide Company, Ltd., of Glasgow, Scotland, has, on the recommendation of Mr. Neill, managing-director, decided to incorporate a subsidiary company in Ontario to be called "The Cassel Cyanide Company of Canada, Limited." Mr. Neill has just reached Scotland after having completed one of his periodical tours of Canada and Mexico and was so favorably impressed with the splendid mineral resources of Northern Ontario as well as with the opportunity that exists for industrial development throughout the Dominion, that he most strongly recommended his co-directors to give this country an especial amount of their business attention.

The object of incorporating a subsidiary Company in Canada is primarily to bring the parent organization into more direct touch with the requirements of Canadian mining interests, but the further outlook is along the lines of general metallurgical and allied industrial development. Three members of the Glasgow board will be on the directorate of the Canadian company. All are highly successful business men, each being a specialist in the section of the organization to which he has given a life-long study.

Mr. William Neill, the managing director of the Glasgow company, will discharge similar duties in Canada and will be more frequently on this side of the Atlantic than formerly. He has been associated with cyaniding since Mr. John S. McArthur, the original managing director of the Cassel Company invented and developed the cyanide process which has been of such inestimable benefit to the gold and silver mining industry.

Sir George Beilby is the inventor of the process for manufacturing cyanide which the Cassel Company adopted over twenty-seven years ago. During the war he patriotically devoted much of his energy toward developing methods of extracting oil from coal, so as to render the British navy less dependent on foreign countries for the fuelling of oil-burning high-speed naval vessels. In recognition of his many discoveries and of his scientific attainments he received, two years ago, the honor of knighthood. Sir George has devoted much of his spare time to the study of radium, especially in its metallurgical extraction and in its application to the treatment of diseases. He is president of the British Radium Institute.

Sir Edward Allen Brotherton, another director, is a chemical manufacturer and the private owner of many large acid plants in various parts of England. His specialty lies along the lines of saving waste by-products and turning them to profitable account. He has several times been Lord Mayor of Leeds, and, at the commencement of the war, raised and equipped the regiment of which he is honorary Colonel. He was created a baronet slightly more than six months ago.

One unique feature in the operating of the parent company as regards gold and silver mining has been the acquiring of interests in properties of potential merit and of helping mines which may be unable to reach the profit-earning basis for no other reason than that of lacking a treatment plant. Mr. W. E. Simpson, who joined the original Cassel Company nearly twenty-four years ago, has, during the past seven years, attended to this part of the company's affairs from the practical standpoint and has spent much of his time in examining properties and, where need be, of installing the necessary plants.

Canada welcomes the arrival of the organization and, for many reasons, especially in the interests of its own development, heartily wishes the Cassel Cyanide Company of Canada, Limited, every success. The service rendered in the time of war has not been forgotten—that service wherein the mines of Canada were supplied with cyanide requirements at a price lower than the average in any other of the British Dominions.

PERSONALS.

R. B. Watson, general manager of the Nipissing mine, left Tuesday evening on a trip to various points in the United States.

W. E. Simpson is now en route to Glasgow, on board ss. "Cassandra." Mr. Simpson expects to return to Canada later in the summer.

Homer L. Gibson, broker, of Toronto, is in the Porcupine district this week in connection with the development of the Clifton-Porcupine mine.

Presidential Address by Hugh K. Picard

INSTITUTION OF MINING AND METALLURGY, LONDON.

Introduction. In addressing you to-night I propose to follow the course taken by my predecessors in giving a brief survey of recent metallurgical progress, in so far as such has come within the purview of my particular character on matters affecting our industry. In normal times it would be a simpler task to follow and record such developments, but the War has imposed entirely new conditions which increase the difficulty of a review, such as secrecy (in order to prevent leakage of information to the Enemy), urgency (wherein economics have been thrown to the winds in the materialization of a desired military result), an entire re-grouping of the factors of chemical and metallurgical supply and demand, and, finally, the promise of revolutionary changes in regard to labor.

As to the first of these it is to be hoped that, as the necessity for secrecy no longer exists, many of the great advances in technical and metallurgical science evolved under the stimulus of war may now become known for the early benefit of our national industries.

Further, it is much to be desired that such industries as have sprung up in response to our urgent necessities (other than those concerned with the production of purely war material) will not only be retained by us, but will continue to develop to the advantage of the country and the nation. Certain of these have been re-created in an artificial atmosphere of State support or subsidy; several, with such assistance, having reached a stage of technical efficiency, it appears to be of vital importance that further encouragement should be afforded them for such periods as will secure their permanence or of their requiring a minimum of external support.

Tungsten. A typical example of this is the tungsten industry, about which so much has been made public. Even the non-technical reader is now familiar with the general facts regarding this metal, while a certain amount of information as to its production has also become known through the technical press. It will be sufficient for me to refer to Julius L. F. Vogel and A. F. MacLaren, whose able work resulted in the production of this essential metal—essential not only in war, when its supply was a vital necessity to the country, but also in time of peace. Its importance is well expressed by the American metallurgist, Colin Fink, who says: "It may some day be said that tungsten made democracy possible." Through the efforts of these metallurgists and their associates we are now independent of foreign supplies and, moreover, the quality of the British production is superior to that previously imported from Germany.

Flotation. In regard to recent metallurgical advance during the past few years it will probably be conceded that the practice of flotation has brought about greater progress in metallurgy than any other single invention. At the inception of the froth-flotation process in 1905, oils, such as oleic acid (then deemed to be insoluble), were used. As careful analysis showed the mineral so frothed to be intimately associated with the insoluble oil employed, the impression was gained that this had uniformly coated the particles which had been floated, and that the air bubbles had become attached to such oiled particles. As the amount of oils used was relatively minute, say 2 lb. to the ton of ore, while the aggregate surface of the particles oiled is enormous, calculation showed it to be questionable whether an oil could be distributed qua 'oil' in such extreme tenuity and still retain its original physical properties.

With the discovery, some four years later, that other and wholly-soluble frothing-agents were found equally and sometimes even more effacious, the conception that oil was primarily essential to frothing was necessarily modified, and the process became more widely known as that of 'froth-flotation.' With later discoveries as to the partial solubility of essential oils, of the beneficial effect of certain insoluble oils in 'stabilizing' the froths and of sub-aeration procedure, the elimination of any need for pulp-heating, or in many cases for acidification, together with the use of alkaline circuits, etc., modern flotation has made remarkable advances.

Broadly speaking, the essential conditions for effective flotation appear to be that the material to be floated must be capable of flocculation, while that not to be floated must be brought as nearly as possible to the reverse state. This is achieved by the addition to the ore-pulp of reagents which by adsorption or sorption at the surfaces of the various particles increase such differentiation. Acids, alkalis, and certain alkaline salts act in the direction of wetting the gangue by water more profoundly, producing a deflocculation effect, whereas the adsorption or sorption of a minute amount of an immiscible oil at the mineral surface renders this still less capable of being wetted by water, and thus stabilizes a mineral-coated bubble in water

The water-soluble portion of an oil, or a water-soluble substance such as cresol, amyl-alcohol, etc., reduces the tension of water, and thus permits the latter to form an extended froth surface for occupation by the less water-wetted floatable mineral. Certain oils may thus pay a dual part in flotation. Variations in ore constitution — both physical and chemical in the nature of the water, in choice or limitation of reagent, and in local conditions generally—are so wide that each one will present a flotation of its own, requiring individual study. Where the factors are so varied flotation must in large degree remain an art, as well as a growing science. This condition, however, governs applied science generally, and metallurgical processes form no exception to the rule.

I understand that contributions to the more scientific aspects of flotation may be expected shortly, which will, no doubt, go far to elucidate the fundamental principles on which the process is based.

Since the outbreak of war flotation methods have been widely, indeed almost universally, adopted. During this period, the greatly extended use of this process in the United States is the most notable feature, and it is hardly too much to say that concentration practice has been revolutionized: in addition to the increased recoveries of mineral due to the ability of this method to deal effectively with slime, its adoption has led to a general simplication of concentration procedure, with a corresponding reduction of working cost.

In modern installations, such as that of the Inspiration Consolidated Copper Co., at Miami, Arizona, where the plant was specially designed for flotation, the current practice is to limit the units to the smallest number possible. At this mill the ore, first crushed by disc-crushers, is passed to tube-mills, working in closed circuits; the pulp is then immediately sent to flotation units with the consequent elimination of all intermediary steps in the concentration. The re-treatment of any middling products and the enrichment of the primary concentrates is also effected by flotation, resulting in a simple flow-sheet.

Froth-flotation has developed the use of settlers and vacuum-filters, which are now indispensable units in concentration plants adopting this process. The settlers are in some instances employed for the re-utilization of plant-water, and in others for the thickening of concentrate prior to vacuum-filtration; their usual size is from 30 to 50 ft. in diameter, but in some instances settlers of over 200 ft. in diameter are in use. The shallow 'tray' settler is also employed where the physical character of the ore permits; these consist of units 3 to 4 ft. in depth superimposed on a common shaft to economize space and secure increased capacity.

Similar progress has marked the evolution of the flotation-units themselves. In the Mineral Separation type, for example, the driving gears have in some instances run continuously for over three years. These units are self-regulating, the supply of reagents being automatic, so that in practice it is not uncommon to find one man per shift operating units dealing with between 3000 and 4000 tons of ore per 24 hours.

Everywhere the tendency is toward the elimination of hand-labor; thus, besides ore, the concentrate and tailing are handled by settlers and belt-conveyors, whereas the grouping of all units is designed with the object of reducing labor, space, and construction cost to a minimum. The result has been a reduction in cost which, in many instances, has rendered obsolete the best of the older gravity concentration systems.

Some comparative figures as to the advantages of flotation may be of interest. The total tonnage of ore treated by water concentration at the Anaconda plant from February 1902, to December 1915, was approximately 36,000,000 tons, carrying 1,250,000 tons of copper, of which the actual recovery was approximately 900,000 tons. In 1916, flotation was installed, from the results of which it is estimated that had it been used during the earlier period 175,000 additional tons of copper would have been saved, capable of realizing, less cost of treatment, a further profit of nearly £8,000,000. In 1913, when water or gravity concentration had attained perhaps its high-water mark of efficiency, the five largest disseminated copper mines in the United States produced approximately 162,000 tons of copper, but discarded about 83,000 tons in tailing, the average recovery of copper at these mines being about 66%; had flotation been employed it is now demonstrable that their increased recovery for that year alone would have exceeded £3,500,000. In its turn, however, flotation has introduced new smelting problems, mainly due to the fineness of the material to be handled; the International smelter, at Miami, which now represents the latest copper-smelting practice in America, has been specially designed to deal with this type of concentrate. Hand-labor here has also been practically superseded by mechanical appliances; specially designed cars handle the concentrate and facilitate loading and unloading, prior to its passage to the roasting-plant. The roasters are fired either by oil, or coal-dust, the latter having now proved the more economical; the Cottrell process here becomes a necessary adjunct, preventing dust losses with practical completeness. Again, progress in one department of metallurgy has imposed conditions which have led to improvement in another, thus the cost of smelting the fine concentrate, originally so difficult to handle, is now reduced to between 5 and 6 shillings [1.25 to $1.50] per ton of charge.

Though the theoretical principles underlying flotation are still unsolved, progress in this direction is being made and it is one of the most remarkable features of this process that its use has been so greatly extended while its full scientific basis is yet unestablished. Callow, whose contribution to the technique of the art deserves special mention, calculates that with four different oils, three oil-percentages, two pulp-densities, and two changes of temperature, the possible communtations are no less than 59,284. This gives some idea of the difficulty experienced in arriving at the effect of any given change of conditions, but in spite of this over 400 flotation plants have been installed on the North American continent alone.

Zinc. Passing to the metallurgy there has not been any marked improvement of first importance in smelting during recent years, though general advance in matters of detail may be recorded. The problem of the mechanical roasting of the ores cannot yet be considered as completely solved, especially for the more refractory type, such as Broken Hill concentrate, which forms so large a proportion of the world's supply of raw material. Though improvement has been effected in this direction, as exemplified by the Ridge and Spirlet furnaces, it is significant that in the latest zinc works to be erected in this country, the management have adopted the hand-rabbled Delplace furnace as being the type best suited to their requirements. These works, situated at Avonmouth, are being constructed by the National Smelting Co., and are designed for an ultimate output of 50,000 tons of zinc per anum. These when completed, with extensions of other existing works, should go far toward establishing the industry in this country on a much sounder basis that existed before the war. No effort is being spared to make the Avonmouth works thoroughly efficient and up-to-date. The general arrangement is well designed, and provision is made for future extensions. The pottery has a capacity of 45,000 retorts, and is arranged for convenient handling in and out; two hydraulic pot-presses are to be installed (one of which is already erected), which will supply the retorts for the 16 retort-furnaces contemplated. These are of modern gas-fired type, the retorts being arranged in four rows back-to-back. The air is pre-heated in regenerative chambers under the furnaces, and are protected from injury due to slag from broken pots by the interposition of a layer of chrome-iron ore between the regenerators and the retort-chamber. Five gas-producers are provided for each pair of furnaces, two being in regular use for each furnace, the fifth being a spare one which can be turned on to either furnace as may be required.

Though Delplace furnaces are being installed for roasting, the management is erecting one of special design, upon the results of which future additions will

depend. The former are of large type, having six muffle-hearths each with 18 sections, and should be capable of dealing with 20 tons of raw concentrate per day. Special care has been taken in the design to ensure easy renewal of the hearth as required.

The acid plant, of platinum "contact" type, was originally built by the Government, and has been used for the manufacture of sulphuric acid from Sicilian sulphur. With the necessary additions for cleaning the roaster gases from arsenic, etc., this plant will be available to deal with the sulphur di-oxide evolved from the 20 roasting-furnaces it is proposed to erect.

In view of the present high cost both of labor and material and the improved extraction now called for, much attention has lately been given to the question of treating retort-residues for their metallic contents, both as to still contained zinc, and other metals such as lead and silver, if present. It has been proposed to blow such residues on Wetherill grates, but this yields a mixed product of zinc oxide and lead sulphate and affords only an incomplete elimination of the silver. Other objections are the inferior quality of the product (due to a certain amount of fine grit being carried over with the fume), while if silver be present the blown fume acquires a pinkish tint, rendering it unsuitable for paint purposes; further, the silver, both in the fume and the ultimate residues is lost. In the absence of silver, a market exists for the zinc oxide-lead sulphate product, if free from grit and carrying about 20% of lead; such a mixture makes a paint of covering power superior to pure zinc-white, besides being cheaper. For ores of a less complex character, 'blowing' the residue offers fair possibilities, and it has even been proposed to modify the usual distilling practice in the direction of only recovering the more easily distilled portion of the zinc, calling for the employment of a smaller amount of reducing coal and leaving a richer zinc-residue for blowing. Such a procedure would increase the capacity of the distilling furnace and result in longer life of retorts, as they would not require to be submitted to the high final temperature necessary to drive off the last units of zinc.

Wet Processes for zinc extraction with the subsequent recovery of the metal by electrolysis have not become firmly established; Ashcroft's pioneer work in this direction will be remembered. The conditions necessary for success, notably roasting at a low temperature to avoid the formation of insoluble ferrite, and the subsequent perfect purification of the solution are now well understood, the latter condition being demanded by the necessity for keeping the deposited zinc in a passive state to prevent re-solution. As a necessary consequence electrolytic zinc will always be highly pure compared even with the re-distilled zinc producible from retorted metal. Much discussion has taken place as to the possibility of the electrolytic process displacing the older method; but it seems probable that for some years to come both processes will survive, and that local conditions with regard to nature of ore, power-cost and facilities, etc., will determine which method shall be adopted for any particular case. It may be said for the electrolytic process that it certainly permits the utilization of low-grade and complex zinc ores which could never be available to the retort process. As an example, the Consolidated Mining & Smelting Co. is treating ores by this method at Trail that assay as low as 20% zinc and carry 14% of lead. Further, combination dry-and-wet processes are likely to develop wherein the zinc oxide (and lead if present) are concentrated as a 'fume' for subsequent treatment by solution of the zinc followed by electrolysis. Such methods have the advantage of yielding a zinc solution requiring the minimum of purification, while leaving other metallic contents in a form recoverable by smelting.

At Anaconda, Laist has proceeded in a reverse direction, by first extracting roasted flotation concentrate with acid, electrolyzing the purified solution, and treating the residue by volatilization in a reverberatory furnace, the contained zinc being recovered as oxide. According to recently published information, Laist no longer recovers the zinc by volatilization, confining this operation to the saving of the lead, while the zinc passes into the slag. How far this is due to more perfect original extraction of the zinc in solution in the previous operation is not stated.

These developments are due in large degree to the work of American metallurgists, who have at their disposal large supplies of ores of varying character offering scope and opportunity for special methods of treatment. But in this country also zinc has been regularly produced by electrolysis from ores, though on a smaller scale; given, however, equal opportunity we may certainly claim to possess the necessary technical knowledge to compete with foreign producers.

The War brought about a large demand not only for the highly-pure electrolytic zinc of 99.95% grade, but also for metal of 99.9% purity obtainable by the redistillation of ordinary brands, and even of 'hard' spelter, which contains about 90-92 zincs, the remainder being mainly iron. The method chiefly adopted in this country was devised by Fricker, who distils the metal in vertical closed crucibles provided with connecting pipes leading into a brick condensing-chamber common to a number of pots, generally eight. The lead and other impurities are prevented from passing over with the zinc-vapor by covering the surface of the molten metal with a floating filter of crushed coke, or similar porous material. By this process large quantities of refined metal have been produced for cartridge-brass and other purposes. How far the demand for high-grade zinc will persist for ordinary commercial uses is uncertain. For most alloys containing a substantial percentage of zinc, as also for galvanizing, ordinary brands of spelter are sufficiently pure; hence consumers are not likely to pay the higher price demanded for 'purity' metal.* The latter will therefore have to compete with G.O.B., and producers may perhaps be forced to accept a price only greater in proportion to the higher unit of the purer product.

Zinc Oxide. Before leaving the subject of zinc metallurgy, reference may be made to the manufacture of zinc oxide in this country. Before the War practically the whole of our requirements were met from Continental and American sources; indeed, our secondary products were in some cases bought by German firms, exported to the Continent for treatment, and the zinc-oxide produce again sold to us. War conditions have since brought about the establishment of a domestic

*The galvanizer would prefer pure zinc if obtainable at a reasonable price, as a more durable product results from its use.

zinc-oxide industry; and, as in other cases, we now produce this material of a quality equal in all respects to that hitherto imported. Works capable of producing 50 tons or more per week are running regularly, and, given reasonable protection against unfair competition, there seems no reason why the whole of our requirements should not henceforward be met from domestic sources.

The oxide is manufactured by distillation of hard spelter, scrap, etc., with subsequent burning of the volatilized metal to oxide, which is collected in bag-house plant in the usual way. Technical details as to pipe arrangements, fan-capacities, etc., have been worked out, and the conditions necessary for the production of the highest quality product have been established. No doubt there will still be competition from American oxide, produced directly from ore, owing to the lower cost of the raw material employed. This oxide, though of inferior color, is suitable for many purposes, such as rubber filling; moreover, it possesses the advantage of high density. Oxide production from ores and residues though not yet established in this country is being investigated, and there is reason to anticipate that this may eventually prove successful.

In South Wales zinc-dust ("zinc blue") has recently been manufactured direct from metallic scrap and a product obtained which is far superior to that derived as a by-product from the retort process; the latter usually contains about 85% of active zinc, whereas the former carries not less than 95%. The demand for high-grade zinc-dust in the dyeing industry is large, and, owing to its superior reducing value, it should have a good outlet in gold-precipitation.

The prepared fume is screened in a flour-miller's bolting machine; owing to its granular character no difficulty is experienced in screening. The product though excessively fine is uniform in size of particle and free from dust; under the miscroscope each grain is seen as a brilliant metallic sphere. A word may be said as to the perfection of the bolting machine for screening fine powders; this has been developed to meet the stringent requirements of the corn-milling industry and if better known would no doubt find application in screening dry crushed ore.

A wider general knowledge of the practice of industries other than our own would, I believe, lead to the discovery of many appliances which could be adapted to our special needs. For example, the filter-press was well known to the potter before its value was recognized in ore treatment. He has, from our point of view, the worst possible type of clayey material to filter and in addition contamination by iron rust must be avoided; hence he adopts a press with wooden frames. We could perhaps reciprocate by introducing to him the vacuum-filter and pulp-thickeners.

Pottery. While on the subject of pottery an interesting application of gold may be referred to, though this perhaps comes rather within the province of chemical industry than metallurgy. It is not commonly recognized that the gold decoration of cheap pottery consumes a large amount of the metal in such a manner that it never returns to the market. The gold-line decoration on cheap cups and the 'solid' gold handles on cheap 'ornamental' vases is in fact gold of almost the highest degree of fineness employed in the arts. The compound as employed consists of an organic salt of gold in an oily medium, and as applied does not contain more than about 6-9% of metal. The desired decoration is painted on the otherwise finished ware, which is then heated to about 700°C., far below the melting-point of gold. Over 90% of the compound, consisting of the oils and medium, is thus burnt away, leaving the perfectly uniform coherent film of gold with which we are all familiar. The metallic components consist essentially of pure gold, but modified to the extent of about 1% with other metals, which brings about the brilliant metallic film; and it is interesting to remark that if absolutely pure gold be employed no such film would result, the effect being instead a dull earthy pink deposit. This affords another example of the influences of a small amount of a foreign metal on the mass, a feature so frequently met with in almost every branch of metallurgy. So coherent is the film, in spite of the loss of over 90% of the original compound, that it may be used as a satisfactory base for electro-deposition thereon of another metal, such as silver, for decoration or other purposes. Platinum behaves in a similar manner, and it is possible that for certain purposes porcelain dishes coated with gold or platinum by this means may be of service in the laboratory.

As another illustration of borrowing from other industries, the metallurgical furnace-builder may derive much assistance from the glass industry and *vice versa*. Oil-firing, now so commonly employed in smelting, is well known to the glass-maker, who may have experience in its use not generally known to the metallurgist. My object in the above remarks is to call attention to the advantages which must result from a freer interchange of knowledge and experience between our various industries. To this end one of our leading societies, the Society of Chemical Industry, has in normal times an annual program of visits to various works, giving members the opportunity of inspecting operations in which they are not directly interested.

Copper. For developments in the metallurgy of copper we naturally look to the United States. Thanks to the publicity given to progress in the States and to their excellent technical publications, we have been made familiar with recent advances and it thus becomes unnecessary to refer to them in detail. Among such, reverberatory practice (due to the ever-increasing amount of flotation concentrate to be smelted) may be mentioned. In this connection the increased throat-area, with correspondingly larger burners for oil or coal-dust firing resulting in largely increased output per furnace, should be noted. The El Paso 130-ft. furnaces burning oil have reached a daily capacity of over 960 tons with a consumption of 0.61 barrel of oil per ton. Leaching of oxidized copper ores by ammonia, so often suggested in the past, has come within the domain of practical metallurgy. For example, it is reported that the Calumet & Hecla Mining Co., in a plant treating 2,000 tons of tailing per day, is recovering copper at a total cost of 6.25 cents per pound, with a loss of only one pound of ammonia per ton of ore. Further developments have also taken place in acid-leaching plants in connection with which A. W. Halin's process deserves mention. He passes the acid solution through a number of ore-charges until the solution becomes neutral. It is then delivered to a tank containing fresh ore whereby the ferric iron is precipitated, whence, after acidification, the solution passes to the electrolyzing plant for precipitating the copper. The treatment of ore in heaps by leaching, following Rio Tinto practice, is also being extended in America.

In this country the industry cannot be said to be flourishing, though in spite of war conditions, and partly because of them, some notable achievements have been effected. One instance of overcoming a serious difficulty may be cited, as showing the adaptability and resourcefulness of our metallurgists. In this case the ores to be smelted demanded the addition of pyrite, hitherto imported from Spain. Owing to the requirements of the Governmnt for Spanish pyrite for acid-making this source of supply was cut off, threatening the closing down of the smelting operations. A new and hitherto neglected supply was, however, developed by the manager (one of our members) from the pyrite seams of the Welsh collieries, and it is satisfactory to record that this source now meets all the requirements of the works, not only for sulphur, but when calcined it is available as iron flux for smelting oxidized ores. The neglect to make use of this supply in the past is no doubt due to the reluctance of colliery proprietors to admit the existence of sulphur in their mines, as it might reflect on the quality of the coal. However, they now recognize that they have in pyrite an asset of value; moreover, it now pays to mine coal-seams rich in pyrite that hitherto have been left. The pyrite is recovered by hand-picking on belts. In the result the copper-works now secure ample supplies at a cost considerably below that previously paid for Spanish mineral; it is strange that this material has been overlooked by acid-makers in spite of the great demand created by the War.

As producers of copper we can, of course, never expect to compete with the United States, but, given a measure of State assistance, we ought to be in a position to secure for treatment a fair share of ores and matte from our own Dominions. For this purpose increased electrolytic refining capacity is certainly needed, but until some security for the industry be assured there is no inducement to capital to embark in such undertakings. The ever-growing demands of labor, with consequent increase in the price of raw materials, unless checked, must inevitably tend to drive the industry to countries where easier conditions prevail. The recent heavy fall in the price of the metal due to over-production, and the withdrawal of consumption for war purposes, calls for economy in every direction; it also points to the necessity for State action, failing which it is difficult to see how the industry can survive.

The Metallurgy of Gold, in so far as it relates to the recovery of the metal from its ores, shows general improvement, but nothing of first-rate importance except perhaps Crowe's method of precipitating cyanide solution under reduced pressure. He shows that the air dissolved in the solution, has, owing to the different co-efficients of absorption, a composition of 35% of oxygen and 65% of nitrogen, and consequently is a more active oxidizing agent than air of normal composition. He points out that in weak cyanide solutions, consequently with a minimum of hydrogen being generated, the oxidizing action of the dissolved oxygen largely neutralizes the reducing action and may even overcome it. In normal practice this is met by adding lump cyanide at the head of the precipitation box, with consequent increased consumption of both cyanide and zinc. By the adoption of the vacuum process this practice is unnecessary and extraction may be effected with weaker solutions resulting in savings in all departments, including the production of a purer bullion. The Portland Gold Mining Co. reports a saving of $30,000 per year in zinc and cyanide in a plant treating 2,000 tons of ore per day. It is interesting to note that G. T. Hansen claims similar advantages by heating the solutions to 170° F. before precipitation.

Concentration of gold ores by flotation is making progress, but the field for this process is somewhat restricted, owing to the general high efficiency of the older methods. At Cobalt, flotation has replaced gravity concentration, although at the Nipissing mine this process has been rejected, not on account of its inefficiency, but because of the difficulties in subsequent treatment of the concentrates. On complex gold-silver concentrate involving further treatment, the advantages of flotation compared with ordinary concentration followed by cyanide are not so manifest. The value of flotation as a means of increasing the world's output of gold lies rather in improved recovery of base metals, such as copper, with which gold is so commonly associated.

With reference to the production of gold, and more particularly to the question of a bounty, this is a matter for settlement between the economist and the producer. It is a subject upon which so many varying opinions have been expressed by authorities that it is difficult to arrive at any decided conclusion. So far as our own direct interests are concerned, a bounty on gold would be an obvious benefit, as we have many members engaged in this industry, though the objections to this course are also weighty.

A committee of the Council of the Institution appointed to report on the position of the gold output of the British Empire made an exhaustive inquiry into the subject, and issued their report in March, 1918. This shows that a reduction of 20 per cent of the Empire's gold production is visibly imminent, and this at a time when the need for gold is ever more pressing.* There can be no two opinions as to the vital importance of not only maintaining but also increasing our gold supplies, and with the object of effecting this the committee recommend a 10 per cent bounty on the output of all struggling mines or alternatively a bounty of two shillings (48c) per ton of ore treated. Proposals on these lines, however, were not acceptable to the Government Gold Production Committee.

It seems self-evident that unless relief in some form be granted, the production of gold must necessarily fall by the stoppage of the lower-grade mines; apart from the influence this would have on the general economic position, as to which opinions vary, a serious injury would be done to gold mining as an industry. Lord Inchcape's committee, however, is not disturbed by the prospective stoppage of these mines, and does not consider such an eventuality to be of any great importance to national interests† Although there may be objections or difficulties in the granting of a direct bounty it would not appear impossible to concede some remission of taxation, and to this extent relieve the industry

*The accuracy of this forecast is shown by a recent question in the House of Commons in which the Chancellor of the Exchequer was asked if he was aware that there had been a drop in the gold production of the British Empire of 13½% in the year 1918, compared with 1915, and that the world's production showed a drop of 20% in the same period. The figures given were not questioned.

†Since these words were written the Chancellor of the Exchequer has stated: "There is nothing in the report of Lord Inchcape's committee to suggest that producers of gold are not entitled to obtain for their produce the best price available in the most favorable market, and I am now considering in what manner this can be secured."

of some of its unfair burden. We already have a precedent for such action; children are considered to constitute a valuable asset to the State, and in principle, though to a very slight extent, taxation relief is granted to the producer. Why, therefore, should not similar action be taken in regard to gold?

Lead. In the metallurgy of lead, also, recent advances seem to be in detail rather than in fundamental improvements. In the stress of recent years there has been small opportunity of developing new processes in industries that are well established on recognized lines, such efforts being rather devoted to specialties called for by the War. Mention, however, may be made to progress in hydro-metallurgy, as applied to oxidized lead ores. This has been limited to brine treatment with or without the addition of sulphuric acid to carbonate and sulphate ores. This process has been tested in America as well as in North Wales, where a small plant was working until the difficulties of obtaining supplies caused a temporary cessation of operations. In this case the material to be treated consisted of an extensive dump of blende and lead sulphate slimes. Vanner concentration yields a mixed product of no value until further separated. This is effected by agitating the concentrates with hot saturated brine at 70°C., whereby the lead sulphate is completely dissolved, with, of course, the equivalent formation of sodium sulphate. The presence of this salt in growing proportions interferes with the solubility of the lead sulphate, and must therefore be removed by the addition of the equivalent amount of calcium chloride. The lead solution is filtered from the blende-calcium sulphate residues, and precipitated with slaked lime, reforming a portion of calcium chloride; about 50 per cent of the chloride is regenerated, the balance of the chlorine being precipitated with the lead as oxy-chloride. The blende-calcium sulphate residues are then re-treated on a vanner, which effects perfect separation of the easily removed flocculent sulphate, leaving a saleable blend concentrate. The chief objection to the process lies in the chloride present in the lead precipitate involving volatilization loss in smelting, but this may be overcome by precipitating the lead by electrolysis, using soluble iron anodes. This process is limited in its usefulness by the relatively small quantity of material available and by its inapplicability to silver or gold contents. It may, however, develop in the direction of the treatment of low-grade sulphide ores, after a sulphating or chloridizing roast at a temperature low enough to prevent the volatilization of the lead chloride.

In the province of general metallurgy the increasing use of the Cottrell process deserves special mention. As an example of painstaking research in developing a practical process from a long-known but unused scientific fact it has few equals. We have to go back to 1870 to the work of Dr. Tyndall for the first disclosure of the phenomenon on which the process is based. This was further examined by Frankland, Lord Rayleigh, and Oliver Lodge; but for the useful application of the principles involved, we had to wait for Dr. Cottrell. He first applied the method to depositing sulphuric acid mist produced in the contact process, and is still being used for this purpose. It is satisfactory to report that the merits of the invention have been recognized in this country, the first plant to be erected here in 1917 being at one of the Government acid-plants. It is also in use here for the precipitation of fumes from metallurgical works, following established practice in America; its further extension in this country seems certain. The advantages of the process are far-reaching; not only are valuable products recovered, but agriculture in the neighborhood of the operations is saved from serious damage. We are glad to congratulate Dr. Cottrell on receiving the Perkin medal as a recognition of his valuable services to industry.

The Metal Industry. In considering the position of the metal-producing industry before the war, one cannot but be struck with the apathy of the Government in regard to a matter of such vital importance to our security. It is true that as soon as the seriousness of the position was realized, energetic steps were taken to meet the situation. That within such a comparatively short time the difficulties were overcome is a striking tribute to the ability and energy of the technical men in this country. Industries were created and developed in a period of months which had been the subject of many year's growth on the part of foreign producers; not only were we able to produce articles equal to those obtained from abroad, but in many cases higher standards of purity and efficiency were achieved. The production of high-grade tungsten already referred to is an example of this, while in other directions the manufacture of magnetos and optical glass has reached a state of perfection unsurpassed by makers possessing prolonged experience.

These facts demonstrate that our position in pre-war days was in no sense brought about by lack of technical knowledge or skill, though it has been usual to refer to our inferiority in this direction, as well as to lack of initiative and energy, as being the true cause. The experience of the war shows this view to be unfounded, and that given reasonable facilities and the absence of official and fiscal discouragement we can, so far as technical knowledge is concerned, place ourselves in the front rank as producers of all essential materials. This charge having been proved to be baseless, it is clear that in order to maintain our position as producers some protective steps must be adopted; failing this, there is every reason to suppose that our new or revived industries will relapse into their pre-war inefficiency. It is reported, for instance, that efforts are being made to re-introduce foreign glass into this country, which if successful (unless effected under conditions which will protect our own manufacturers) cannot but tend to harm, if not to destroy, an industry which, under war conditions, has succeeded in re-establishing itself.

I am, of course, referring here only to such industries as were either non-existent or were in a struggling state, and this condition obtained largely in the production of certain essential metals. This possibility has been officially recognized, and committees have been formed to examine into the problems and make recommendations. Lord Balfour of Burleigh's committee on commercial and industrial policy after the war has made an exhaustive inquiry into the subjects covered by the Terms of Reference. A study of the committee's final report reveals the complexity of the subject. The departmental committee's report on the iron and steel trades ascribes the relatively stationary condition of this industry in part to deficiency of our iron-ore resources, but primarily to greater efficiency of German and American methods.

A point is made of the individualism of the British character which prevents the manufacturer from "pooling his brains and capital to the greater ultimate ad-

vantage of the industry." This would appear to be a just charge. It is well known that with few exceptions large amalgamations are not looked upon with favor in this country, where moreover every effort is made to maintain secrecy in regard to working processes and operations generally. I cannot say from personal knowledge how far this applies to the steel trades, but it is very evident in other metal-producing industries. I am satisfied that nothing but benefit would result from removing the restrictions to open discussion which persist in this country. We should do well to open our works to the visits of technical men interested in the subject, as this would inevitably result in the exchange of experience and information to mutual advantage. The present attitude is certainly not dictated by the technical managers, who as a body would welcome such an interchange of knowledge, but are excluded from this benefit by the action of their employers.

W. R. Ingalls, in his admirable presidential address before the Mining & Metallurgical Society of America this year, says on this subject: "One of the cardinal principles of American engineering during the last 20 years has been the exchange of information and the promotion of publicity about everything—technical processes, business relations, corporate affairs. We have seen America forge ahead largely owing to the absorption of this idea, while Great Britain lagged behind. . . . She is wide awake now."

It is to be hoped that the awakening referred to has indeed taken place. Apparently this secrecy is not confined to our own special branch of industry. C. F. Cross, in 1916, on the occasion of the presentation to him of the medal of the Society of Chemical Industry, said: "He was particularly aware of the difficulties which they had encountered, especially that of being between the crossfires of the commercial or financial man whose watchword was secrecy and the scientific man whose disinterestedness, perfectly natural and spontaneous, led him always to wish to publish in order that he might communicate what he had found in his laboratory to his fellow scientific men. . . They . . . were always most anxious to take counsel with their brother chemists, and give them the benefit of anything that had impressed them, just as they looked to hear of any new discovery by others at the earliest possible moment."

This condition is reflected in our own Transactions (and to a less extent in our technical journals), which contain but little information on important undertakings in this country. In analyzing the papers published in the last ten volumes of our Transactions, I find that 35.8 per cent deal with mining in foreign countries and our dominions and colonies. Foreign, etc., metallurgy supplies 17.3 per cent; assaying and analysis 15.0 per cent; general 27.7 per cent, whereas British mining in these islands is confined to a solitary paper, and British metallurgy to six papers, or 3.5 per cent of the whole. It is true that some of the general papers find application here, but the record can only be considered as unasatisfactory in that it fails to present in any adequate manner important operations which we know are being conducted. I hope these remarks may have some effect in removing the veil of secrecy which overshadows our undertakings.

Reverting to the committee's report, the Departmental Committee (iron and steel) favors combination both in production and in realization of produce, but is also of opinion that protection in some form is required to give security to industry. Other departmental committees report on similar lines, ten such being in favor of a tariff, while three (representing the cotton, jute, and building industries) report against. The main committee is by no means unanimous on the point, but it should not be beyond the capacity of the Government to reconcile the conflicting views, and decide on the course most advantageous to the country as a whole. It would be out of place and indeed superfluous to discuss the well-worn arguments for and against tariffs, though it would probably be found that the majority of the members have very definite views on the question.

Though the committee leans toward protection it expresses the fear that such might result in stereotyping inefficient methods, but in my view there is little ground to support this, I anticipate, on the other hand, that the feeling of security engendered by a suitable degree of protection would stimulate producers to adopt modern methods involving capital expenditure which under present conditions they decline to risk.

The committee is strongly of opinion that State control will be found detrimental to peace conditions, a conclusion with which most will agree, though recent action in regard to both coal mines and railways does not encourage the hope that this opinion will find favor. It is also eminently satisfactory that they agree with the resolution adopted by the Imperial War Conference as to the formation in London of the Imperial Mineral Resources Bureau. Much of the foundation work of the bureau has been accomplished, and there is good ground for anticipating that the hopes of its promoters will be realized.

It was my intention to discuss in some detail certain aspects of the problem of reconstruction in so far as our special interests are affected, but these have been so fully and carefully analyzed by W. R. Ingalls, in his address already referred to, that little remains to be said. I am in no sense detracting from the merits of his remarks when I say that he is addressing those who are already converted, but few have the knowledge and ability to put the case so succinctly and convincingly. It is earnestly to be hoped that it may come into the hands not only of Labor leaders, but of those in control of Government departments having relations with mining and metallurgical matters. Naturally he deals mainly with American affairs, but his arguments bear with equal force on conditions existing here. He makes reference to these, but in my view his opinions on our position are somewhat too sanguine. He will pardon me for giving one or two extracts. He quotes the view of an American visitor to this country, who says:

"England is knitting together for work. The directors of capital and organized labor were never more together. . . . England is studying efficiency and is preparing for overseas competition."

Mr. Ingalls himself says:

"We have seen how Great Britain practically lost important metallurgical industries . . . and we see her now keenly studying and introducing improvements that will . . . not unlikely put her ahead of us."

It will be admitted that there is some tendency in this direction, but the union and progress foreshadowed are still far from achievement. No doubt his reference to conditions in Europe are designed primarily to stimulate the efforts of his own countrymen. The ever-growing concessions of shorter hours at higher pay must be carefully watched in their effect if we are to

maintain our position against foreign competition. From this point of view it is almost a matter of satisfaction that similar claims are being put forward in America.

Mr. Ingalls in his masterly address shows the economic fallacy underlying such demands as have recently been pressed. I take the liberty of making two more quotations: the first, addressed to the American engineer, has equally forceful application to ourselves:

"First of all, what I see is that the engineer should saturate himself with sound economic doctrine. This is just as much the basis of his professional work as are the sciences of physics and chemistry."

The second will, I hope, reach the class to whom it aptly applies:

"The social reformer, who does not understand production, is a far less important person in the promotion of human welfare than the engineer who does."

The principles he lays down as to the general economic position apply with perhaps greater force to this country, since we are to so large an extent dependent on overseas countries for our supply of raw maerials.

It is beyond my capacity to forecast the future of metallurgy in this country. Our industry is suffering in common with many others from the lack of any clear indication of the fiscal policy of the future. The Minister of National Service and Reconstruction has certainly stated that all raw materials required for national industries would be admitted without restriction, but whether this applies only to the reconstruction period or is to be the final settled policy, seems uncertain. So far as his statement goes it indicates that ores, which are essentially raw materials, will be admitted freely, and to this extent the smelting industry would benefit; but if metal, such a spelter, which may be looked upon as raw material from the galvanizer's point of view, is also included in the list we may have a hard task to hold our own. In regard to this, however, there is ground for a hopeful outlook, as he also intimated that industries which it was essential to foster would receive a measure of protection in some form. I think it will be admitted the production of metal is among such industries.

Regarding the labor situation, we are, I think, justified in anticipating that the Industrial Conference will lead to greatly improved relations between Capital and Labor, though up to the present some of the more important groups have held aloof from the Conference. It is to be hoped that legislative effect will be given promptly to the proposals and that the National Industrial Council will be the means of promoting and maintaining industrial peace.

Though the future may be beset with difficulties it is not the time to take pessimistic views, but rather to use every effort to meet them and to accommodate ourselves to the new conditions brought about by the war. Shakespeare puts the following lines into the mouth of King Henry V when in a position of difficulty before Agincourt:

". . . . 'tis true we are in great danger;
The greater therefore should our courage be.

. . . . . .

There is some soul of goodness in things evil
Would men observingly distil it out.

It is in this spirit that we must go forward, striving if possible to extract the small essence of goodness which may, after all, be extractable from the vast slough left to the worl das a war legacy.

THE NORTHERN MANITOBA FIELD.

By R. C. WALLACE.

Prospecting is now general throughout the northern Manitoba belt and the prospectors have distributed themselves without partiality over a wide area. There has been a marked inclination to go further afield on the Hudson Bay Railway as far as the first crossing of the Nelson River and even further, a fact which in itself demonstrates that the railway is the incentive to development work and investigation of every kind in the north. The greatest interest, however, still centres around Athapapuskow Lake.

Since last fall there have been two discoveries on the western part of that area in the belt in which lie the Mandy and Flin Flon deposits at the North end of the North-East arm of Schist Lake.

The Davidson Copper Discovery.

A discovery was made by Pete Davidson of high grade chalcopyrite ore occurring in stringers at the surface but showing very promising indications of width at a depth of six feet. Prospecting is continuing at depth on this deposit in order to ascertain the extent of the ore body. The samples which have been brought down to The Pas show an intimate mixture of chalcopyrite and pyrite with values in copper considerably less than the best Mandy values, but undoubtedly sufficiently high to represent good profits provided the ore-body proves to be fairly large.

The discoverers of the Flin Flon property uncovered very high grade copper ore on the east side of the middle arm of Schist Lake and some few miles east of the Manx property. The values compare very favorably with the Mandy ore, but little development work has yet been done to ascertain the size of the body. Work continues on the chalcopyrite and pyrite showings in the epidotized greenstone on the East Arm of Athapapuskow Lake and thence eastwards through the first and second Cranberry Lakes to Copper Lake, where Peterson and Gordon are investigating a property which shows rather abundant galena in a quartz base and gives on assay good values in gold and silver.

Herb Lake.

In the original Herb Lake field development has been somewhat delayed by the inability of Makeever Bros. to operate the Rex mine under present conditions of labour and with the obligation for development which they are compelled to meet in their properties in Mexico. There is reasonable assurance, however, that the mine will be operated before the close of the summer and that the necessary underground development work will be first carried out to make it possible to feed the mill to capacity. There are other properties in the district which should not be held back because of this temporary delay in operation, and capital has been and is interested in the taking over of several of the best of the Herb Lake properties.

Prospecting is also going on on Wintering Lake, on the Pipe Lake belt, on the Burntwood River and at several points in the neighbourhood of the railway as far north as the Manitou Rapids. Samples that have recently come out from the railway belt show that there is scope for successful prospecting on more than one point in the neighbourhood of the railway, while the transportation facilities which are provided, form an additional incentive for prospecting in this district.

Flin Flon Negotiations.

Mr. Hammell has recently had a consultation with his partners in the Flin Flon property relative to the

basis of a deal which he hopes can now be negotiated with a very important mining corporation in the East. The declaration of peace and the steady and very satisfactory rise in the price of copper, which, there is every indication, will continue for some time, are factors which will assist Mr. Hammell greatly in negotiating a deal. The early operation of the Flin Flon property would be a factor of very great importance for the whole district, not only from the point of view of mining development, but in many other ways, and every assistance that can be given by both the Federal and Provincial Government will repay the authorities very handsomely in the increased actual wealth of the province and the country.

If it be found advisable to develop the power for the operation of the mine and district from the Churchill River, and if a narrow gauge light-railway system were maintained in operation (as it should be) after the power development and transmission line are completed, the famous Sturgeon fisheries of the Churchill River and the very valuable fisheries of Reindeer and South Indian Lake could be tapped and for the first time made accessible to the markets.

Transportation and Power.

The Dominion Government, through the C.N.R., has specifically promised to build a railway from The Pas to the smelter. The Provincial Government has recently passed an act enabling the Government to operate and transmit water power, and should undoubtedly assist, if the opportunity arises, by supplying the power necessary to operate both the property itself and the smaller mines which would require the use of power. In an undertaking of the magnitude that the operation of the Flin Flon demands, a share of the burden of the initial capital, in so far as that is possible, should be carried by the Governments concerned in the spheres, such as railways and water-powers, in which they are more directly concerned.

Display of Ore Samples.

A display of ore samples from the northern district was recently sent to the International Mining Convention at Nelson, B.C., where there were represented a very large number of collections from the Eastern British Columbia area and the Northern States. Arrangements were also made to have samples from the other Manitoba fields represented, but the unfortunate tie-up of the express service made it impossible to send samples to the Nelson Convention in time. For the Northern Manitoba collection, two first prizes were obtained and two special diplomas. No other collection obtained two first prizes and only very few special diplomas were awarded at the whole convention. To the Mandy ore came one of the first prizes and special diplomas. To the Northern Manitoba Mining Co. at Herb Lake, came the other first prize and special diploma. Other prizes were obtained for gold and nickel and there is no doubt that the convention was impressed with the fact that Manitoba stands no longer on its reputation as a wheat-producing province alone. Mr. H. MacLeod was in charge of the collection and reports that a great deal of interest was taken in the collection and that many who are interested will personally examine the field in the month of August. A paper by R. C. Wallace was read on "Mining Development in Northern Manitoba" and the local papers were supplied with material relative to the work in this area. One of the most fruitful methods of stimulating interest and development in all mining fields in the Province will undoubtedly be found in the display of good representative collections, fully labelled and with sufficient descriptive material, accurate in character, to convince all mining men and mining financial interests. With the co-operation of mining districts further south in the Province, this will be made a feature of all future mining conventions.

Special Correspondence

NORTHERN ONTARIO.

Boston Creek District—Government Blamed for Lack of Roads.

The failure of the Ontario Government to assist in the development of the Boston Creek mining district is uppermost in the thoughts of those citizens of Northern Ontario who possess a genuine sense of fair treatment to those concerns, backed by capital from abroad, which have chosen this district as the most attractive place in which to apply their efforts at mine development.

Early last spring, the Ontario Government, through Hon. G. Howard Ferguson, stated that a road was to be built for the accommodation of the mines in that district. The summer is now well advanced yet not a shovel of dirt has been turned. Instead, privately financed companies find it necessary to maintain their own roads, not only for their own benefit, but for the benefit of the entire camp.

In the Miller-Independence section of the district a lot of money has been spent, with very successful results. The Independence has alone spent about $300,000, and will expend perhaps another $100,000 before the end of this year, by which time it is expected to be treating ore at the rate of about 75 tons daily. This company is financed from the United States, chiefly from Dayton, Ohio. The Company has built its own road and has maintained it, and the Ontario Government, despite the fact that a large number of other property owners use this road, has not seen fit to even lend assistance in its upkeep.

In addition to the rich ore-bodies proven to exist in the Miller Independence section of the Boston Creek district, the area farther east, in the townships of Catherine and Skead, is attracting more and more attention. The mining companies operating in the Skead area are seeking a road to the Boston Creek station by way of the Miller-Independence mine. The distance from Skead to the Independence is about thirteen miles, and would necessitate the construction of a bridge across the Blanche River. They are asking the government to build the bridge and to advance two-thirds of the cost of building the thirteen miles of road. These companies would pay one-third of the cost. The road would pass through one of the most promising prospective mining areas in the north.

Within the next three months many carloads of materials will have to be transported over the road from Boston Creek station to the Miller-Independence mine, a distance of about three and one-half miles. Coal alone will average about one carload each week. Carloads of lumber, cement, machinery and supplies must be taken in before bad weather sets in. As a consequence, this company is obliged to prepare and maintain a road, not only for its own use, but for all the other mines in the district.

The development of the whole Boston Creek district is being retarded by the neglect of the Government to redeem its promise to provide road facilities. So far, the Ontario Government has not spent one dollar to assist highway transportation in this important and promising district. Boston Creek miners are energetically protesting against the unfair treatment they are receiving.

Gowganda to Cobalt by Motor.

That the inevitable connecting of the various districts of Northern Ontario by motor roads is coming about slowly but surely is demonstrated in the fact that an automobile was driven this week from the Gowganda camp, by way of Elk Lake, to Cobalt. The distance is not great, being perhaps not more than one hundred miles along the route of the road. But, the incident attracts attention due to it being the first time the through trip has been made.

The road from Gowganda to Elk Lake, when the present work of macadamizing it is completed, will be a good one, but at the present time it is but a rough waggon road through the bush, some thirty miles in length. Over the first few miles east from Elk Lake it was found necessary to travel over comparatively rough roads, paralleling the Elk Lake branch of the T. & N. O. Ry. There roads were found to improve on approaching closer to the main line of the T. & N. O. Ry., where fair roads are maintained through the farming districts and over which the trip was completed to New Liskeard, and finally to Cobalt over the macadam road passing through Haileybury.

It is learned that Henry Cecil is endeavoring to negotiate a deal for the disposal of the Hohenaur claim in the Kirkland Lake district. Promising progress was reported to have been made this week in Toronto.

It was also intimated that C. E. Wettlaufer, of Buffalo, might become involved. Also, that an endeavor might be made to consolidate the Hohenaur with two or three adjoining properties, including the Hunter-Kirkland.

A fair measure of encouragement and success is understood to be attending operation at the La Rose Consolidated. Recent unofficial reports, however, have exaggerated the situation, it is understood.

The Crown Reserve Mining Company has arranged to have a small amount of exploration work done on mining claims acquired a few months ago in the Larder Lake gold district. The company is also planning a small amount of exploration work on claims recently secured in the Gillies Limit.

McKinley-Darragh's Statement.

The financial position of the McKinley-Darragh, as shown in the statement just sent out, is concrete evidence of the success being met with this year. As of June 23rd the statement shows cash in bank $259,371; ore in transit and at the smelter $134,000; ore at mine ready to ship $57,700, making a total of $469,071. This compares with a total of $346,861, as of March 22nd.

During the second week in May the excellent physical condition of the McKinley-Darragh was pointed out in these columns. It was shown that net earnings were far in excess of dividend requirements of 3 per cet. quarterly or 12 per cent. annually. The official statement just submitted to shareholders corroborates the advance information printed in this paper about two months ago.

It is a further interesting fact that the present high production is being achieved with a force of men considerably less in number than the average employed throughout 1918. During recent months, working forces have been reduced to about 180 men, a reduction of about twenty per cent. A number of changes have been made and a high degree of efficiency is obtaining.

The dividend of 3 per cent. paid this month amounted to $67,428 and makes a total of 9 per cent. or $202,284 distributed so far this year. That the present rate of dividends will continue for years would appear to be certain. First, is the fact that the $469,071 now on hand is sufficient to care for dividend requirements beyond the first quarter of 1921 without drawing from profits made from operations in the meantime. However, at the present rate of output, not only will this surplus of about 20 per cent. be left intact for use at some later date, but current earnings may add to the surplus in addition to covering the 12 per cent. annual dividends.

Present Price of Silver Increasing Cobalt Returns.

Readers have been shown recently in these columns that the output of silver from the silver mines of this district will have reached the total of $306,056,976 fine ounces by the end of the current year, and that the total value will approximate $184,641,387. This shows that the quotations for silver since 1904 have averaged approximately 60 cents per ounce. It further shows that had silver averaged $1.10 per ounce as in the month of June this year, the entire output since 1904 would have a value of approximately $336,662,673.60, as compared with $184,641,387 actually received. In a word, provided silver quotations are to rule as high as an average of $1.10 an ounce, then Cobalt lost approximately $152,021,286.60 by having been discovered and mined during a period of the lowest silver quotations in history.

However, the mines of Cobalt are not worked out, and the camp as a whole will be a heavy producer of silver for a good many years. The mining companies operating in this field produced $12,135,816 in 1915, with silver averaging a little under 50 cents an ounce. With silver considerably more than double the 1915 average, the added value more than makes up for the lower output in point of ounces, and 1919 promises to be a more prosperous year than was either 1614, 1915 or 1916.

Had the situation been reversed, it is probably true that the majority of the mines in this district would at present be closed down. That is, haw silver averaegd above $1 an ounce during the early years of mining in Cobalt, and dropped to around 50 cents an ounce at the present time, the camp would not be the big thriving industrial centre that it is to-day. It is fortunate therefore, that the rise in quotations for silver has taken place at a time when most needed, and that the lowest average occurred just at a time when the camp was in its prime and in excellent physical condition to stand the strain.

Therefore, although low silver values in the early years of the current century denied the mining companies scores of millions of dollars, yet the fact that good fortune now smiles radiantly upon the silver producing companies, serves to offset the unfavorable silver market in the early days.

NORTHERN ONTARIO (Continued)

Low Fatality Rate in Northern Ontario Mines.

Previous reference has been made in these columns regarding to the fact that there was no fatal accidents during 1918 in connection with the silver mining industry of Ontario. This year the record is not quite so favorable, two men having already been killed.

When it is considered that close to three thousand men are employed at the silver mines of this province this record compares favorably with the best in the world. For instance, in the United States it is stated that an average of three out of every thousand employed at mining meet accidental death each year.

Clifton-Porcupine Mine.

Satisfactory progress and excellent results obtaining at the Clifton-Porcupine mine bids fair to add still farther to the extent of the profitable gold mining area of Porcupine. It is learned that at the first level where drifting operations are under way the vein is the full width of the drift and carries considerable quantities of visible gold. At the present point of operation the ore is stated to be high grade.

The mining plant is working smoothly and will be sufficiently powerful to meet requirements until the completion of the new and larger electrically driven plant, a part of which equipment has already arrived and a part of which is in course of transportation. With the completion of the new modern plant it will be pressed immediately into service. The present temporary plant will then have served its purpose and no delay will have been incurred during the period of installing the new equipment.

General Mining Notes.

In addition to the usual amount of ore from underground, the Mining Corporation is treating about 300 tons of tailings from previous operations. For the time being the tailings are being drawn from a large stock pile at the west side of the railway, but the work of pumping from the bed of Cobalt lake will begin very shortly.

Up to the present the new oil flotation equipment has not been used due to the fact that cyanidation is being found satisfactory. The material being treated is first ground to forty mesh.

Alfred R. Whitman is stated to have been engaged as consulting geologist for the Boston-McCrea property at Boston Creek. Mr. Whitman made his first visit to the property last week, and will make a re-study of the property accordingly as the occasion appears to demand.

The reported discovery of high grad eore at a depth of 575 feet on the Temiskaming mine is stated to have been incorrect. In view of the policy of the company being decidedly reticient in so far as information as to development work is concerned, the report gained a good deal of headway in a short time.

Milling operations are being carried on by the Pittsburg-Lorrain Syndicate, in South Lorrain with a fair degree of success. Some difficulty has recently been experienced in securing a supply of water, which has caused only temporary inconvenience. The mine and the mill of the Wettlaufer mine are under lease to the Pittsburg-Lorrain.

The action taken by the Tough-Oakes Gold Mines against its former president, C. A. Foster, involving some $1,896, no matter what the outcome of the affair, does not appear to constitute any reason for shareholders of the Tough-Oakes Company to become alarmed lest it should be the forerunner of more serious litigation that would again serve to draw the company into a position where the operation of the mine should suffer.

As far as can be seen at the present time, any future litigation appears likely to be confined to the minor phases incidental to the complete winding up of all differences which at one time existed.

The company is adequately financed to carry on operations in a big way, and following the clearing up of labor difficulties, the mill will be pressed into service, and the company shall then be permitted to enjoy the prosperity which has been held in abeyance, both due to the war in Europe and due to litigation.

The work of pumping out the underground workings of the Marigold property, formerly a part of the Lucky Cross mine, is under way, presumably preparatory to the commencement of mining operations. This step is taken as an indication that work will be started regardless of the present labor strike in that district.

The Adanac has made a shipment of concentrates together with some high grade ore, the whole amounting to between 50,000 and 60,000 pounds. Although detailed figures are not available, yet it is understood the returns from the shipment will serve to place more money in the treasury than the amount with which the current year was begun.

Further exploration work is being carried on, the most promising of which is the driving of a raise from the underlying diabase up into the Keewatin directly above. The vein being explored is about eight inches in width, and contains heavy cobalt mineralization. It is situated on the northern part of the property.

Diamond drilling was commenced this week on the Gold Reef property, situated in the north-western part of the township of Whitney, in the Porcupine district. Some years ago some speculator ore was found on the Gold Reef, the ore occurring in narrow pay-streaks.

MINING PERSONALS.

T. R. Jones, manager of the Buffalo Mines, is in Cobalt, on his regular monthly business visit to the mine.

M. P. McDonald, mining engineer, is making an examination of mining property in the Larder Lake district.

Max Morgenstern, shareholder in the Temiskaming, is paying a visit to the mine this week.

A. R. Whitman, mining geologist, has returned to New York after spending a few days on business in the Northern Ontario field.

Lieut.-Col. Johnston, of the Tough-Oakes Gold Mines, has returned north after an absence of a week or so on business at Eastern points.

BOOK REVIEW

Recent Publication of the United States Bureau of Mines. Abstracts of Current Decisions on Mines & Mining. Reported from September to December, 1918, by J. W. Thompson. Bulletin No. 179.

This useful digest of legal findings on matters relating to mines and mining is the latest volume of a series of great value. The subject index, which is carefully compiled, arranges the contents in a manner that makes reference easy for the non-legal reader, and in addition there is a Table of Cases, which gives the information as to origin of the abstract for legal readers.

An interesting reference is contained in the Chapter on Eminent Domain in connection with the application of one operator to use the tunnel belonging to another operator. It is laid down that the power of the Legislature of Utah in making mining a public use is conceded, and the purpose of the statute should not be hindered by any narrow or technical objections. The importance of encouraging the mining industry of the States must be kept in view, and as this "was the object, intent and purpose of the Legislature in passing the Act, and its wisdom, policy and expediency were thereby determined, a reasonable, fair, just, broad and liberal view should be taken by the court in the interpretation of the Statute."

There is a tendency to break away from the old rigid rules on the subject of "public use," and to enlarge the definition of the term so as to make it synonymous with "public welfare," and the test of "public welfare" instead of the old doctrine of "public use" is being gradually extended with the promise of its becoming the prevailing doctrine in most jurisdictions.

The owner of a mine sought by appropriation proceedings to condemn a joint use of a mining tunnel, the use to be in connection with that of the owner of a tunnel, and where the tunnel was not used to its full capacity by the owner. Proof that the condemner owned a mine and that the cost of the construction of a separate tunnel would be too great to justify this, and if the condemner cannot reach his mineral deposits through the existing tunnel, he will be prevented from removing his mineral deposits. There is prima facie evidence that it is necessary for the condemner to have a joint use of the tunnel in order to develop and mine the ores in his mining claim.

The burden of proof that the use required is a "public use" was laid upon the condemner. As to compensation, it was held that some just method, based upon all the known facts, is all the law contemplates, and is all that can be required in such a case.

This series of decisions seems to afford an important set of precedents in the application of the doctrine of "Eminent Domain" to mining operations. The principle appears to be that minerals constitute a public property, or perhaps, a more correct expression would be that the development of mineral is necessary for the public welfare, and that any condition of ownership which prevents such development, is against public welfare, and is open to correction and remedy by the power inherent in the state as the representative of the people.

Samuel Underhill, superintendent of the Queen Mine, Sheep Creek, died at Spokane, Wash., recently. He had been employed on McCune property in the interior of British Columbia for about thirty years.

MINE EXPLOSION FROM STRIKING MATCH NOT HAZARD ARISING OUT OF EMPLOYMENT.

In the First Division of the Court of Session, at Edinburgh, judgment has been given in an appeal in an arbitration under the Workmen's Compensation Act, between the Woodilee Coal & Coke Company, Limited, Lenzie, and Mrs. A. Robertson, whose husband was a miner in the appellants' employment, and was injured by an explosion in the Meiklehill Colliery. He died as the result of his injuries. The explosion occurred on his striking a match to light his pipe, after finishing his piece, at the customary knock-off in the middle of the shift. The possession and use of matches in the pit were prohibited by the Coal Mines Act, 1911, and these prohibitions were known to Robertson. Sheriff-Substitute Kippen at Dumbarton found that the explosion was an accident arising out of and in the course of the employment, and in law that the appellants were liable to pay £300 of compensation to the widow.

The First Division reversed that finding, holding that the deceased added a new peril to his employment by striking a match against prohibitions. What he did was for his own purpose, and was innocent enough but did not arise out of his employment.

Special Correspondence

The Silver Bell Mine, situated on the south fork of Kaslo Creek, and the Silver Bear group of mineral claims, which adjoin each other, are to be consolidated. The Silver Bear group has recently been acquired by the owners of the Silver Bell mine and it is understood that the development of the two properties is to be proceeded with this season.

There is said to be a renewal of interest in mining along the Upper Kootenay Lake, which is evinced in development work on a number of properties which have been comparatively inactive. The Blue Bell mine at Riondel, the operation of which has been interfered with by the flooding of the mine workings, is being pumped dry and probably will be in a position to resume mining and milling operations at an early date. This, of course, is contingent on lead marketing conditions improving. In the meantime it is likely that shipments of carbonate will be resumed. The carbonate ore which is of a rather low grade, but the mining costs of which are not heavy, formed a considerable portion of the tonnage sent out from the Ainsworth mining division last year. With the slump in lead prices following the signing of the armistice these shipments were discontinued. The Curle Manganese properties, near Kaslo, is to be operated again this summer, a small shipment of this class of ore having been asked for by the Consolidated Mining and Smelting Company. The Cork Province Mill on the south fork of Kaslo Creek is running on a one-shift basis. The Index Mine is being developed by Spokane capital. A two-ton motor-truck was imported recently for use in connection with this property. This is the first motor truck used in the south Fork section.

Taylor Engineering Co's Titles.

On Saturday, July 5, Land Registrar Smith raised objections in supreme court chambers to registering the title of the Taylor Engineering Company in the Dolly Varden mineral claims because of his construction of the Land Registry Act. These objections were over-ruled by Mr. Justice Murphy, who pointed out that the legislature had passed a special act stating that in the event of two conditions being proven it conveyed the rights in question to the Taylor Engineering Company and whatever the consequencves, the registrar must comply with the act. He then ordered the title registered.

W. M. Archibald, field engineer for the Consolidated Mining & Smelting Co. of Canada, reports that the plant destroyed by fire recently at the Old Sport Group of Mineral Claims, West Coast of Vancouver Island, has been replaced and that development work again is in full swing. Two diamond drills are at work on the surface. The showing so far, it is stated, are very encouraging, the most satisfactory result being the uncovering of a number of high-grade shots of ore. These, in addition to the large body of low-grade ore which there is no doubt is abailable, makes the proposition a good one. Mr. Archibald, however, is doubtful whether any extensive work will be done in the direction of opening the property on a large scale until conditions generally are more stable. In making this observation he refers to the question of labor as well as that of the cost of supplies. However, when the problems which large industries now are facing are more or less settled there is no doubt that the Old Sport Group will be made a shipping mine, second to few in importance in this Province.

M. E. Purcell, of the engineering staff of the Consolidated Mining & Smelting Co. of Canada, recently inspected some iron properties on Iron Mountain, near Merritt, B.C. He appeared satisfied with what he had seen and stated that it was his intention to make a more exhaustive examination at a later date.

Interest in the mining properties of the northern section of British Columbia, to which the town of Stewart is the gateway, continues keen. Charles Caldwell, the operator of the Kootenays, who recently acquired interests in Portland Canal, predicts that the Stewart-Salmon River Railway will be under construction this year. He states that a company has been formed, that the necessary capital will be provided, and that tenders for the contract will be invited in the course of a few weeks.

Meanwhile the development work on various properties which have gained considerable renown recently proceeds and, if reports from usually credible quarters are to be believed, the showings are such as to justify optimistic prophesies. The Premier Mine, for instance, is said to have encountered high-grade silver ore in one of the lower tunnels.

S. I. Silverman, of New York, is expected at Stewart during the summer and P. Welch, the Canadian Railroad Contractor, who is a heavy owner of mining property on the Salmon River, is visiting the district.

A compressor plant has been installed at the Maple Leaf Mine, Franklin Camp, near Grand Forks, B.C. This has been done to facilitate development work and in the opinion of P. B. Freeland, Resident Government Mining Engineer, is an encouraging indication of the determiatio of some of the owners of this camp to prove their properties.

Sir Donald Mann, who with Sir William Mackenzie, is the builder of the Canadian Northern Railways in Canada, now absorbed by the Canadian National Railway System, passed through Vancouver, B.C., a few days ago on his way to examine the Big Missouri Property, Portland Canal, as well as to inspect other holdings in which he is interested in the Portland Canal District. In a statement made before going North he stated that the Big Missouri was not a mine but was a good prospect. He was not in a position to say anything more about it, but if it looked good he would send an engineer from New York to inspect and report upon it. Sir Donald said that it was not his present intention to arrange for the operation of the railway which was constructed some years ago in the Portland Canal Country.

The development of large copper deposits on the Ecstall River by the Granby Consolidated Mining & Smelting Co., is being carried on energetically and with good results, according to word from that camp. While the ore is said to contain considerable sulphur this will not interfere with its economical utilization, it being pointed out that smelting processes have been so improved that while this may have been a serious disadvantage in the past it now offers little difficulty in respect of treatment. Work of an exploratory character has been under way on the Ecstall Property for two years, and it is stated that the showings developed indicate that there is a bigger mine in the making there than now exists at Anyox in the well-known Hidden Creek Mine. It is reported in this connection that there is a strong probability that the smeltery at Grand Forks, which was recently closed down by the Granby Company, will be removed to Ecstall River. There has been no authoritative statement, however, to this effect.

The Queen, Nugget, Bonanza and Ore Hill Mines, situated in the Sheep Creek District, are being opened up and from the information available the showing generally are reassuring. Activity in this section, however, is not confined to these properties. Development is proceeding on a number of prospects and there has been a considerable influx of miners. An illustration of the extent of the recent improvement in conditions in this section is found in the reopening, after a period of two years idleness, of "The Half-Way House." This is situated on Sheep Creek, and is reported to be well patronized.

PRINCE OF WALES TO VISIT THE NORTH COUNTRY.

The Prince of Wales is to visit Cobalt on September 2nd, and will be escorted through one of the leading silver mines of the camp.

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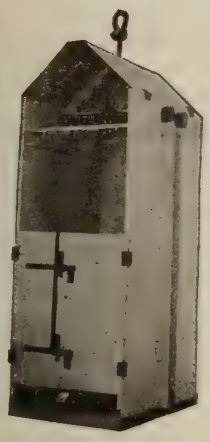

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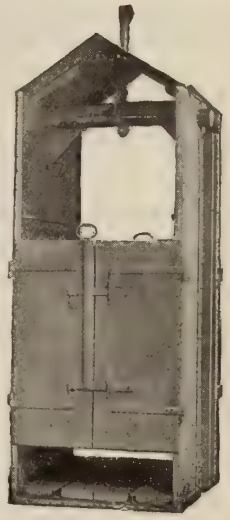

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1 Baldwin	11″ x 14″	”	28″	6	6′6″	40000	22′8″
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The owners of the Cane Silver Mines, situated in the township of Cane, in the Elk Lake district, have failed to conclude the proposed deal with Buffalo interests. The deal appeared to have fair chances of being consummated, but a last minute hitch occurred.

The Cane Silver Mines consists of about 120 acres on which a number of narrow veins containing patches of native silver have been found. The formation is diabase, and in no case has silver been found to continu eto more than a few feet below the surface.

Silver was first found on the property in the spring of 1913, and the claims have been explored in a small way intermittently during the last six years.

THE DERBYSHIRE (ENGLAND) OIL BORINGS.

The flow of oil at the Hardstoft bore has not appreciably increased, and it has been decided to instal a pump. A similar experience is expected at the other bores, and while the finding of oil is not by any means unimportant, no indications of a "gusher" of oil in quantity has yet been observed.

The question of a royalty on oil is being largely discussed in England. The Government is being urged to announce a reservation of oil to the Crown. The question of royalty on a flowing substance is rather a new one in England, and it raises a number of considerations of source, direction of travel, and support to adjoining properties which are not in question in connection with solid substances, such as for example, coal and ironstone.

ALBERTA COAL STATISTICS.

Some interesting figures have been compiled by John T. Stirling, chief inspector of mines for the Province of Alberta. They show the coal output for the province during 1918 and indicate its relation to Canada's total production. During that year, he points out, the consumption in coal was approximately 37,237,065 tons, of which 22,057,065 tons were imported from the United States, and of which total 2,559,041 tons were imported into Western Canada. In 1918 there were produced in the Province of Alberta 6,148,620 tons of coal, 100,470 tons of briquettes, 32,858 tons of coke, and 9,898 tons of shale for the manufacture of bricks. There were 7,687 tons of bricks sold. During the period in question 317 coal mines were in operation in Alberta, as well as two copper and two shale mines. Seventy new mines were opened, while nine old mines were reopened. Off-setting this to some extent there were 71 mines abandoned. To operate these mines an average of 2,633 persons were employed above ground and 6,144 below ground.

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:-: EDITORIAL :-:

THE COBALT STRIKE.

Elsewhere in this issue will be found an editorial statement by the Montreal "Gazette" on the Cobalt strike. Two striking intimations are conveyed by this editorial. It is assumed that the Cobalt strikers felt convinced that the Minister of Labor favored a strike, and also that the necessity for a strike arose, not from intolerable industrial conditions, but from a desire to gain certain political ends. A graver accusation could scarcely be made against a member of the Government. It is admitted that "recognition" is the point of contention, and the strikers do not plead that wages were low or hours of labor too long. The Minister of Labor has characterised the mine operators as obdurate, and he has asserted the right of a trade union to be recognised by the employers concerned, but he has asserted an entirely new principle, namely that employers must recognise a given and selected union irrespective of its previous relations with employers and its record. This is stretching the privileges of unionism very far, and, if accepted, the effect of such a principle would give freedom of action to the trade union only and no freedom at all to the other party to the bargain. In these days it may seem heretical to advance the statement, but we believe that even an employer of labor has some rights.

The European Commission of the National Industrial Conference Board of New York, after an exhaustive study of the situation in Europe, has reported that "the solution of the worldwide unrest problem rests largely upon the separation of political and industrial issues."

That the Cobalt situation was not an industrial one is evidenced by the mutually satisfactory manner in which employers and mine-workers have adjusted their differences in the Porcupine District. There is a general belief at Cobalt that similar differences could have been compromised there had not the international union organizers succeeded in conveying to the mine-workers the feeling that the theory and propaganda of international unionism was favorably regarded in government circles, and when the "Gazette" puts forward the suggestion that the Cobalt strike is "the manifestation of a political movement of which we have already had evidence," it discovers the menace from which the "obduracy" of the Cobalt operators proceeds.

THE HAILEYBURY MINING SCHOOL.

The Haileybury Mining School, commencing September 2nd is furnishing a Mining Course for returned soldiers, particulars of which are contained in this issue. No commendation of such a policy is required, as it carries its own commendation.

As a concrete example of the new spirit that is moving in secondary and technical education in Canada the Haileybury Mining School is significant. This school would seem to typify the idea of "vocational training" in its most efficient form, as it will permit of instruction being given to young men and aspirants for higher positions in the mining trades while permitting them to follow their regular occupation. This is the only method by which really worth-while instruction can be given to ambitious young men and the subordinate officials in a mining district, and the Haileybury School is justified in receiving, as it has received and will doubtless continue to receive, the support of the local mining companies.

The instruction of the subordinate officials in mining districts has hitherto been lamentably poor in Canada, and the greatest reliance has been placed by aspirants for certificates upon correspondence courses. In their day these correspondence courses have been of invaluable service to men who could not obtain the benefits of college instruction, and their value will not be lessened, but rather increased by the provision of technical schools having the physical equipment for demonstration of the phenomena and problems mentioned in the text-books. But it is not right that ambitious mining men, who desire to rise in their profession, but are limited by occupational ties, by lack of money and remoteness from large centres of population, should be forced to rely entirely upon correspondence courses, or even upon provincial mining schools inadequately equipped with apparatus for demonstration.

The Provincial Government of Ontario is to be congratulated upon the Haileybury Mining School, which may well serve as an object lesson to other provinces of Canada. The writer could not help contrasting the fortunate situation of Haileybury, with its well-equipped Mining School, and its equally well-equipped High School adjoining, with Sydney, Nova Scotia, where with a resident population probably three times exceeding that of Haileybury, and a surrounding industrial population very much larger than is served by Haileybury, the attempt to provide a technical school, although several times made, has never succeeded. The

Cobalt District has one industry only. The Sydney District has many large and varied industries, but so far, the provision for vocational training and secondary education has been limited to the evening classes of the Technical Education Department, which do not provide adequate facilities, or opportunities in any measure commensurate with the magnitude of the industrial development of the district. No criticism is here intended of the work already accomplished by the Director of Technical Education. With the limited means at his disposal as much as possible, and probably more than could reasonably be expected, has been accomplished, but the whole conception of secondary education and vocational training needs to be enlarged.

CANADA'S COAL INSUFFICIENCY.—FURTHER REMARKS.

A leading article in "Toronto Saturday Night," dealing with the necessity to purchase coal at the present time, so as to stimulate production during the season of easy transportation conditions, and to avoid the autumnal rush, reviews the general world coal situation, and comes to the conclusion which has been consistently advocated by this Journal, and which no one can avoid who studies the subject, namely that there is a pronounced world coal shortage, particularly in Europe. In referring to Canada's ability to help, however, we think the writer does not do justice to our coal resources. The article states:

"All this goes to show that Europe is short of coal, and that the United States will be called upon to help out in making good the shortage. No opinion has been expressed as to the prospects for Canadian coal mines being called upon to help out. The only coal commercially available for such a purpose would probably be that which is being mined in Nova Scotia. This is a soft coal, only suitable for manufacturing and coking purposes, and it may be questioned whether it would be in general demand for the purposes for which coal is being drawn from the United States."

Canada is importing annually about sixteen million tons of bituminous coal and about six million tons of anthracite from the United States. We have no available anthracite in Canada, and even if we admit for the sake of argument that we must continue to import anthracite because of its greater suitabilities for domestic use than bituminous coal, yet there remains sixteen million tons of coal imported from the United States, which, considered on the grounds of quality only, could be furnished within our own borders.

But anthracite is not an irreplaceable substance, and there are many instances where Canadian-mined bituminous coal could be very advantageously substituted for anthracite.

There is no anthracite in Europe available for domestic uses, and if there were the people would be ignorant of how to use it. One Province of Canada at least gets along very nicely with "soft" coal, and many of its inhabitants would be puzzled to use "hard" coal. The truth is that anthracite is a convenient luxury, and it is suitable for use in large cities because of its smokeless character, but if we could not get it, we should speedily awaken to the possibilities of bituminous coal.

At least five million tons of the bituminous coal now being imported from the United States could and should be mined in Canada, and the declining or stationary condition of the Canadian coal-mining industry is a most serious matter.

After damning the possibilities of Canadian coal production with faint praise, and some rather cutting truths also, the writer of the article referred to says: "However, there is little to be gained from discussing the possibilities for the export of coal from Canada during the present juncture."

We differ. The questions of both the export and the import of coal in Canada will repay the fullest discussion and the greatest possible publicity. Canada could not only supply a much larger proportion of her own coal needs than is the case to-day, but could also export coal—and some day she will.

F. W. GRAY,

F. W. Gray, Associate Editor of the "Canadian Mining Journal," and Editor of "Iron & Steel of Canada," who has recently been appointed the Secretary of the Iron and Steel Section of the Canadian Mining Institute.

CORRESPONDENCE.

The Labor Situation at Cobalt.

To the Editor of the Canadian Mining Journal:

Sir,—An editorial in your issue of July 9th, entitled "Mining Profits and Wages," which is a misnomer, as far as the essential part of the editorial is concerned, imples a lack of understanding of the real situation in the Cobalt Camp.

The wages paid in Cobalt are, with few exceptions, as high as any paid on this continent. While a few of the larger mines could undoubtedly pay higher wages, the majority are living a hand to mouth existence. Higher wages necessitated a corresponding increase in the cost of all operations and works to the detriment of the district as a whole, and the demand for higher wages does not indicate any very constructive tendency on the part of the Union.

The cost of developing properties in Northern Ontario is a particularly costly one, and one of the chief reasons for the small number of properties now being developed is this big expense for the preliminary operations. This is one of the chief reasons why so many of the companies are looking to other fields where preliminary costs are much lower.

You state that the managers should accept the invitation of the Union to get together and that past history of the Union should not be allowed to stand in the way of such a conference. It is not only the past history with which the managers are dealing but with the present history, as well. The organization is the same now as in the past. The miners have, contrary to your implication, full opportunity to express their views and have seized each and every one of the many opportunities which have presented themselves to air them.

The present trouble is largely due to the avidity with which the Department of Labor has listened to complaints and encouraged the Union in its demands.

To the big majority of the mine workers, the rate of pay and hours of labor were quite satisfactory. Living conditions are good and conditions under which men work are of the best. The whole question is really one of recognition of the Union. The different mine managers have always been willing and pleased to meet and deal with a committee of the employees, but the Union felt that this was destroying its influence and opposed such conferences.

The fact that the men were getting a square deal without the Union interference was too bitter a pill to swallow without causing trouble and the old story of recognition of the Union was once more revived. There were no particular issues at stake, but the fact that the relations between the employee and employer were harmonious and the membership in the Union low, was sufficient excuse to "start something."

Unfortunately the Department of Labor, possibly actuated by a keen nose for votes, and notwithstanding that the mines were operating under one form of collective bargaining, tried to insist that the particular brand of collective bargaining advocated by it and which called for recognition of the Union, should be practiced.

To the average man it would seem that whatever the functions of the Minister of Labor may be, they are not to act as a propagandist for the Western Federation of Miners.

Yours, etc.,

ENGINEER.

Editorial Note.

[The writer of the above letter has misinterpreted some of the remarks made in the editorial referred to. His letter will, however, help our readers to understand the situation at Cobalt. We suggested that the mine managers and the Union should attempt to settle their differences in conference, and suggesed some of the reasons why miners should not expect too large a share of the profits of the few very profitable companies. Our correspondent seems to be under the impression that we were advocating the paying of higher wages. Our remarks were rather directed to the desirability of treating with the Union without putting too great stress on the past history of the Western Federation of Miners.

If we are correctly informed, the labor situation at Cobalt was very satisfactory when the Industrial Relations Commissions visited Cobalt a short time ago. Since then there have been many rumors of impending trouble. It would seem that the endeavors of the Government to find out whether there was dissatisfaction when there was none has aroused in the professional leaders a feeling that they were not doing their work well. They have since been very active in their endeavor to convince the Minister of Labor that the miners were not being fairly treated. Those who diligently look for trouble can find it or make it almost anywhere. If the searcher enlists the services of professional labor leaders he may reasonably expct to succeed in creating a state of unrest.

At Cobalt there have been many meetings between mine managers and their employees to discuss wages and conditions. The men have appointed committees to meet with the managers and there is little reason to doubt that there exists good feeling between the managers and employees at each mine. The present trouble is between the Union and the managers. The officials of the Union appear not to approve of collective bargaining unless the bargaining is conducted by them. Naturally the managers have other views.

If all the mine employees in the Cobalt district formed a Union and elected representatives. we would be strongly in favor of the question of wages being settled at conferences between such representatives and mine managers. Workers are interested in the wages not only at the mine at which they are employed, but at the other mines in the community in which they live. A standard wage for the district is desirable. The determination of such standard wages should be made by consultation between the representatives of all the workers in the district and the managers.

Unfortunately, there is at present no such organization among the mine employees. There is at Cobalt a branch of an International Union to which many of the man belong. Many of the mine employees do not belong to this Union and their views cannot properly be expressed by the Union officials. Moreover, the local Union is controlled in the United States, not in Cobalt. When the mine managers object to recognizing the leaders of the International Union or its local officers as the representatives of their employees, they are quite justified. The men do not properly represent the employees. If there is any need to argue the point we need simply refer to the fact that these professional leaders have called a strike when most of the workers appear not to believe conditions unsatisfactory.

While we do not believe in recognition of the Union as defined by Union leaders for the consumption of members and prospective members, we are nevertheless of the opinion that, since a considerable number of em-

ployees are satisfied to have their union officials represent them, the managers might well listen to the arguments of these officials. This is what we suggested in the editorial to which our correspondent objects. We have little doubt that if granted such an interview the Union officials would in their endeavor to increase membership say that it meant recognition as defined by them. Misrepresentation could, however, be to some extent prevented by giving full publicity as to the character of the conference.

While we urged that the operators should listen to what the union officials had to say, we do not believe that the strike for which those officials are responsible should be settled by conferences between the union officials and the mine managers. The employees of the mining companies have quit work. If they wish to return to work under the very good conditions which prevailed when they went out, they will doubtless take steps to get their views represented properly. How and when they will do it is for the workers to decide. A really representative committe of the workers would not be so much interested in members' fees as in work in the mines at good wages. If they and the mine managers can be brought together the strike will doubtless soon be settled, for wages and conditions at Cobalt are known to be good.—R.E.H.]

THE COBALT STRIKE.

The Minister of Labor has issued a statement or given an interview in which he attempts to defend his position in connection with the strike of miners, which has stopped production in the Cobalt mines. He would like people to believe that every effort was made to avert this strike, but that the mine-owners were obdurate. The principal issue in the Cobalt situation, the only one in regard to which no settlement seems possible, is the question of the recognition of the union in its affiliation with the Western Federation of Miners, represented on the ground by a gentleman of the name of McGuire. A Cobalt despatch to the Toronto Mail and Empire, a paper friendly to the Government, quotes Mr. McGuire as stating that the miners have the support of the Union Government, while "other members of the Miners' executive unhesitatingly state that the miners were told to strike by the Labor Minister."

The conduct of the Minister of Labor in regard to the Cobalt situation, is important, as illustrating his general attitude, and helps to explain why the Industrial Conference is being organized as an Organized Labor Conference. When the Royal Commission on Industrial Relations made its tour of the country last May, a visit was made to Cobalt, and a study made of conditions there. It was found that the operators had gone far in enabling the miners, by wage increases and by profit-sharing through the payment of bonuses based upon the price of silver, to meet the mounting cost of living. The Mayor of Cobalt, Mr. Malcolm McKinnon, in giving evidence before the Commission said, "As far as my knowledge of it goes, I would think there was very little unrest, if any, here. Every person seems to be well satisfied with the conditions here." One of the employers, described the camp as one of the most peaceful in which he had ever been. Another declared that the men on his proprty were perfectly satisfied. Representatives of the miners also testified, and the burden of their complaint was that the mine-owners would not treat with the miners' union. This the owners frankly admitted, stating that they would have nothing to do with the Western Federation of Miners because of its history. The Minister of Labor claims for the Western Federation of Miners that it has changed its ways, that the evils of its policy and leadership of ten years ago are not now to be charged against it. The Cobalt mine-owners, however, are unwilling to risk it. Has the Minister of Labor any guarantee that the constitution of this organization will protect it in the future against domination by men with criminal records or by men who have been deported from any country as undesirable citizens? This question of recognition, was, and is, the whole trouble between the employees and the mining companies at Cobalt. On the question of wages there is not sufficient disparity to preclude a settlement. Yet the Minister of Labor pretends that the strike could not be averted because of the "rather unfortunate" attitude of the employers. His position, then, is that although all other differences might have been composed without a strike, the men were justified in paralyzing the industry as a means of enforcing recognition of their union. If this is not a correct statement of his attitude, perhaps he will clear up any doubts by stating it himself. If we are right, the Minister approves of a strike on a purely political issue, and is prepared to sanction the crippling of industry in order to serve the political ends, not of labor, but of organized labor. His actions and his statement lead to, and permit, no other conclusion. However right that position may or may not be, from the standpoint of Mr. Robertson as a trades unionist, it is an impossible one for a member of the Government, who must be the servant of all the people, and not of any organized minority. Otherwise, government becomes impossible, and Sir Robert Borden, or whatever constitutionally selected Premier may be in office, gives place to comrade Robertson, or some other comrade. It is a serious situation, requiring from the Government consideration and action. It is the manifestation of a political movement of which we have already had evidence, and which will never be easier to restrain than it is now.—Montreal "Gazette."

PERSONAL.

George E. Leighton, the Canadian representative of the Hardy Patent Pick Company, of Sheffield, England, is shortly leaving for England.

I. C. MacKie, for a number of years Chief Chemist of the Dominion Iron & Steel Company, at Sydney, N.S., has been appointed Metallurgist to that company.

Alexander McEachern, for a number of years superintendent of No. 4 (Waterford) District of the Dominion Coal Company, and Alexander MacDonald, also for many years superintendent of No. 3 District, have been appointed as Assistant General Superintendents with residence and offices at Glace Bay.

Lt. H. G. Young, C.E., returned to Canada from overseas on July 15th, and is now at the Military Hospital at Ste. Anne de Bellevue.

Professor H. M. Tory, of the University of Alberta, is visiting in Montreal and Nova Scotia.

Mr. G. M. Ponton has accepted a temporary position as assistant secretary to the Canadian Trade Commission.

Mr. H. E. T. Haultain, professor of mining at the University of Toronto, is visiting copper mines in Michigan.

BULLETIN OF THE HAILEYBURY MINING SCHOOL COURSE FOR RETURNED SOLDIERS.

Under an arrangement with the Department of Soldiers Civil Re-establishment, the Haileybury Mining School offers courses to returned soldiers in the various subjects pertaining to mining. The school is well equipped to carry on classes in ore-dressing, assaying, chemistry, physics, mineralogy, geology, surveying, draughting, mining and mathematics.

Beginning September 2nd, 1919, special short courses will be given in the above subjects extending over periods of from six to twelve months.

At present there is not a vocational officer in this district. Men intending to take this course should write Mr. F. S. Drummond, D.V.O., Sudbury.

The standard of entrance required is the High School entrance examination. Those who have not passed this examination may consult with the Principal of the school so that each case will be dealt with individually.

Outline of Courses.

Mathematics.—The school is prepared to give courses in arithmetic, algebra, geometry and trigonometry from the beginning of the subject as far as the senior matriculation. The courses will be adapted to the needs of those taking the classes.

Surveying.—The course includes chaining, levelling, contouring, transit surveys, stadia surveys, shaft plumbing, mine surveying, and plotting.

(Only those who have completed at least the mathematics of the second year of the high school should attempt this course.)

Physics.—A brief laboratory and class room course in mechanics, heat and electricity.

Chemistry.—Some knowledge of chemistry is necessary in order to intelligently follow the work in mineralogy, assaying and ore-dressing. The course will cover an experimental study of some of the common elements and their compounds, chemical principles, formulae, equations and nomenclature.

A student who has already taken elementary chemistry may proceed with a course in qualitative and quantitative analysis of ores and minerals.

Mineralogy.—A laboratory course covering about sixty minerals, their physical properties and blowpipe tests. This subject is essential to those taking ore-dressing and assaying. A large collection is available for study.

Geology.—A field course dealing with the rock formation of the district. Also class-room work on rock classification and structure, ore deposits and prospecting.

Fire Assaying.—The equipment of the assay laboratory is similar to that of any commercial plant, and the course is carried out along practical lines. Attention is specially paid to the principles of the various operations. The course covers all methods of gold and silver assays, and the analyses of cyanide solutions.

Ore-Dressing.—The ore-dressing plant is among the best in Canada, and probably excels that of any other educational institution in the country. It is equipped to carry on complete tests in the crushing, concentration, cyanidation and flotation of gold and sidver ores. A detailed course in each of these operations will be given.

Mining.—The development of an ore body by means of shafts, drifts, cross-cuts, up-raises and winzes, diamond-drilling. Plan of surface lay-out for a small mine.

Mechanical.—Freehand sketching.

Draughting.—Machine parts, lettering, drawings to scale of machine parts and tracings of the same. Design of simple equipment.

CANADA'S COAL OUTPUT.

Production For May and Imports of Anthracite Below May, 1918.

The Dominion Bureau of Statistics issues the following monthly bulletin as a survey of the output of coal in Canada for May, 1919, as compared with May, 1918.

In addition the imports of bituminous coal for May, 1919, were 736,426 whereas May, 1918, shows 1,437,377. The imports of anthracite coal for May, 1919, were 461,701, and May, 1918, 465,561.

	Output for month of May, 1918. Net tons.	Output for month of May, 1919. Net tons.
Sydney	375,120	288,468
Inverness	20,385	11,059
Port Hood	153	576
Pictou	47,009	43,305
Springhill	46,730	43,351
Joggins	20,180	17,074
Total for Nova Scotia	509,577	403,833
New Brunswick	23,209	11,090
Saskatchewan	21,479	17,819
Alberta bituminous	255,462	187,304
Alberta anthracite	12,141	0
Total for Alberta lignite	144,602	93,695
Grand total for Alberta	412,205	280,999
Crow's Nest	77,819	49,201
Inland	12,711	6,041
Island	160,989	137,553
Total for British Columbia	251,519	192,795
Grand total for Canada	1,217,989	906,536

CHICAGO MEETING OF THE AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS.

September 22 to 26 is the time set for the Chicago meeting of the A. I. M. M. E., at which the progress that has been recently made in technical lines will be fully discussed. Among the subjects to receive particular attention will be the iron and steel industry, which has reached such importance in Chicago. It is planned during the meeting for the Institute to make an excursion as a body to Gary, Indiana. Arrangements are being made to charter a steamer which will convey the members and guests across the south end of Lake Michigan, directly to the steel works. A tour will be made through the various departments of the steel plant, and luncheon will be served at Gary. Technical sessions on subjects in ferrous metallurgy will be held on the boat.

The banquet has been scheduled for the evening of Wednesday, the twenty-fourth, at the Congress Hotel. By putting this function in the middle of the week, it is expected that a maximum attendance can be obtained; members able to come for only a portion of the session can then be present at the banquet whether they come for the first or latter part of the week.

An elaborate programme for the entertainment of the ladies is being prepared, and all members are urged to bring their wives to this meeting.

THE CALGARY INDUSTRIAL CONGRESS.

The demand for a foreign trade commission to represent the western provinces of Canada, exclusively, organization from ocean to ocean in many special adment Association and urged by the president of that organization fro mocean to ocean in many special addresses before public bodies, seems now to be certain of ultimate fulfillment, if one may judge by advices received at the headquarters of the Canadian Industrial Congress, August 11-16, from many sources.

Advices to this effect are received from Winnipeg, from Vancouver and even from Ottawa, and it is now apparent that many of the members of the Dominion Government look with favor on the idea.

The proposal for a foreign trade commission for the West was originated by Mayor M. A. Brown of Medicine Hat, president of the Alberta Industrial Association. It is based on the belief that only by a proper investigation of the foreign markets for Western Canadian products can the West build up industry to its maximum. Such an investigation, it is explained by Mayor Brown, would deal specifically with those possible markets for Canadian products lying on and adjacent to Pacific Ocean routes of traffic and the vast undeveloped Oriental marts.

Mayor Brown holds to the belief that eventually Western Canada will some day be manufacturing on a larger scale than Eastern Canada because of the great potentialities in this connection in China and Japan as well as along the western coast of South America and in Australia.

"The world does not realize," Mr. Brown points out, "that one-seventh of the population of the globe is living and striving and working along the banks of one river alone in China. The possibility of the development of this wonderful market is just one aspect of the great trade which Western Canada and the western portion of the United States will have the great opportunity to deal with.

"Great economists of the day, men with vision, see the development of the Pacific regions as the most striking aspect of the future of our continent. I may add that by Pacific regions I include those inland empires such as our own, Alberta, Canada."

Strong support is being given the project for a Western foreign trade commission especially in Vancouver, B. C., Victoria, B. C., Seattle, Portland, and other western cities more easterly, such as Winnipeg, Regina and Saskatoon. All these cities will be represented by good delegations at the forthcoming Industrial Congress, to be held in Alberta in August. The principal or "educational" sessions of this congress will be held at Calgary, Canada, August 13 and 14. The industrial men of the continent are being asked to participate.

That this is assuming a phase of international importance seems certain from the fact that already a large number of the chambers of commerce of the United States are planning on having delegations in attendance, as well as the city councils and municipalities themselves of many of the more important Western cities.

From as far east as Erie, Penn., and as far south as Florida, assurances are given that representation will be made at the congress, while from Minenapolis and other northern United States cities large delegations will come. From Minneapolis it is possible that a special train will be arranged as very many of the industrial leaders of Minnesota are planning to be present.

A special representation is coming to the congress from Japan and this delegation will be accompanied by delegates from the Japanese Club of Seattle and a corresponding organization from San Francisco. It is possible that a Japanese speaker will be on the program for at least a brief address bearing on the relations as between Japan on the one hand and the United States and Canada on the other.

TESTING NEW ELECTRICAL PROCESS FOR SMELTING.

A test, which is causing considerable interest, is now being made to prove the commercial possibilities of smelting magnetite ore in British Columbia.

On July 9th Mr. J. H. Fraser, managing director for the Vancouver Magnetite Iron & Steel Smelting Company, owners of the Ronaldsay Howe Sound Pig-Iron Smelting Plant, obtained from the B. C. Electric Company, the use of the old power plant at Highland Station for the purpose of carrying out full tests of the Fleet process of smelting magnetite.

The Provincial Government is doing everything possible to encourage the development of the iron industry in British Columbia and has granted $2.000 to carry out the test and has shipped 50 tons of Texada Island ore are to be used. In addition to this the Provincial Government has agreed to pay a bonus of $3 a ton for all iron smelted in British Columbia from British Columbia properties.

Mr. Fleet declares that, by his process, which is electrical he can produce magnetite pig iron at from $11 to $13 a ton, this being considerably less than the oil and coke method used at the Ronaldsay plant which costs $22.

Should the Fleet process prove satisfactory a full plant will be erected and the pig iron then handled through the Ronaldsay smelter where it can be transformed by the oil process into the best of steel. This would place Vancouver on better than a level with iron and steel industries of the East, and will help to continue on the Pacific Coast the industry of steel shipbuilding.

Mr. W. D. Fleet, of Montreal, the inventor of the process is a well known authority in electrical matters. He was superintendent of the Canadian Copper Smelting Company at Sudbury for six years and later installed the electrical apparatus in the big hydro-electrical plant of the Calgary Power Company at Kananaskis and Horseshoe Falls. From Alberta he went to Manitoba, where he was on the Manitoba public utilities commission. His process, which is now being tested on the iron ores of British Columbia took three years of experiment and study and is declared by men who understand smelting to be a successful one.

THE YUKON.

Recently the steamer Dawson sailed for Mayo to tow the big dredge from McQuesten to Mayo, where it is to be knocked down and transferred to Highest Creek. It will there work out several miles of placer ground. L. H. Titus goes to Mayo to look after the transfer. He is manager of the new company recently formed to operate the dredge.

The Use of Explosives in Mines*

By H. Y. RUSSEL, Manager, Technical Division
Canadian Explosives, Ltd.

Probably it would be well at the outset to give a brief outline of the manufacture of explosives, as, in all probability, except by those directly engaged in their manufacture, less is known about the processes involved than about the manufacture of any other commercial product. This is not altogether due to the fact that any great secrecy is made of the processes, but rather because they are unusually hazardous and it is not desirable to expose more people than necessary to the dangers entailed. Consequently it is not the practice of explosive manufacturers to show people not directly connected with the industry through their plants. We believe, also, that it is the general opinion of the average layman that explosives are all the result of some chance discovery rather than the outcome of scientific investigations and calculations. The explosive chemist does not, ordinarily, accidently develop or discover new compounds which are explosives. Rather, he sets out to manufacture a theoretical compound which he knows will be explosive, and what he discovers or invents is a commercial process for the manufacture of the compound desired. Practically all explosives are and have been formulated on paper and many of their characteristics determined by calculations before any of the actual explosives have ever been made. For this reason all up-to-date companies manufacturing explosives have large staffs of specially trained chemists whose duties are to continually test the raw materials that go into the explosive, the mixture of these ingredients as the process of manufacture develops, and the completed article.

The raw materials that go into the manufacture of explosives must be of a high commercial grade. They are bought upon certain standard specifications and, when received, they are tested under the supervision of the chemical division before being used.

The first step in manufacture is the examination and mixing of the "dope," or the material which absorbs and holds the nitro-glycerine or the liquid explosive base. The composition of the "dope" varies in different explosives, but it consists generally of soda. The constituent materials, whatever they may be, are first screened to remove any foreign bodies, and samples are sent to the chemical laboratory for analysis. If the necessary degree of purity is found, the materials go forward for manufacture; if not, they are rejected and properly purified, or if that is not possible they are discarded.

Each lot of satisfactory material is then thoroughly dried, to get rid of the excess moisture and afterwards grained and screened to insure each ingredient having its proper degree of fineness. These operations are of great importance, as any excess of moisture will have a very bad effect on the explosive, making it insensitive and apt to leak, while the screening not only removes small foreign bodies, such as pieces of stone, iron and steel, which would be a source of danger in subsequent operations, but the size to which the article is ground has a marked effect on the quality of the completed explosive. Samples of the dried and screened materials are tested by the chemists, and if satisfactory the different ingredients, with the exception of liquids, are put together in the proportions called for by the formula for the particular grade to be manufactured, and are run through a mixing machine which thoroughly mixes and then again screens them. The result is known as the "dope." This screening checks the first one and also removes any foreign matter that may accidentally have got into the ingredients since the preliminary screening.

Samples of the dope are sent to the chemical laboratory in order that the proper incorporation of the different ingredients may be checked and analysis are made to prove that the proper proportions of the different ingredients have been used.

The dope is now ready for mixing with the nitro-glycerine, or the liquid explosive. Each is carefully weighed to insure proper proportions being used, the dope again screened and put into the mixing machine first, the nitro-glycerine being added and the apparatus started up and run until a thorough mixing is accomplished. This completes the making of the explosive, and again the chemist checks up the results.

The explosives are then conveyed to the packing machines for punching into the paper shells. Different kinds of punching machines are used for nitro-glycerine and ammonia dynamites, and for gelatines (forcites). These machines are controlled as to the force of the punch they deliver and in this way the density of the cartridge and the number of cartridges to the case is largely determined and kept constant. This is checked every half hour or so by weighing several cartridges, so that any variation in the density will be caught and the machine adjusted if necessary.

At times it is a rather difficult problem to maintain a constant density, as some of the ingredients vary considerably in this regard. This is particularly noticeable in ammonium nitrate, which is used extensively in Permitted Explosives for coal mines, so that extra care has to be exercised in making up these explosives.

In calculating the formula for an explosive, particularly one for use in mining, where noxious fumes must be at a minimum, allowances of the oxygen-producing ingredients is made to cover the fume produced, even to the combustion of the waxed paper shell, and samples of the completed cartridges are sent to the works laboratory for final testing.

The packed shells, which are now called cartridges or sticks, are conveyed to the packing house. Those powders containing nitrate of ammonia, which is very hygroscopic, are dipped in a waterproofing compound in order to increase their water resisting keeping qualities. The cartridges are then packed in the cases and weighed, and, in order to again check the density, the cartridges in every tenth or twentieth case are counted and the number required to make the net 50 lb. checked. Both during the punching and packing processes extreme care is taken to throw out all defective cartridges, which consist of torn shells or those partially filled. However, even though the cartridges receive two handlings, it is almost impossible to insure against some cases containing a poorly packed cartridge here and there.

* Paper presented at the Annual Meeting of the Canadian Mining Institute in March, 1919.

Before nailing the case, the packer inserts a slip bearing his number for reference purposes in case of complaints. It is thus possible when complaints are accompanied by the packing slips, to trace the defect back to the packer. Besides the packer's slips the cases are marked on the outside with the month and year in which they were packed.

The analysis made at the laboratory is checked against the theoretical composition. Balistic pendulum and mortar tests are made for strength, and centrifugal tests for exhaustion. Sensitive tests are also made. Samples are also placed in our magazines to be watched to see that the explosive will stand storage.

From the packing house the cases are taken to the magazine and stored ready for shipment. The magazines are so built as to insure their being dry and well ventilated, and stocks are piled so that oldest will be shipped first.

All through the process of manufacture extreme care is taken in the handling of the materials and of the finished product to avoid the introduction of any foreign material, and the motto of the explosive manufacturer is that "Cleanliness is next to Godliness." This extreme care is also necessary in order to reduce the possibilities of accidental explosion. Among the precautions taken may be mentioned the elimination, wherever possible, of all metal parts for containers and apparatus; where this is not possible, brass, bronze, or monel metal is used. All workmen are required to wear rubber-soled shoes, and are not allowed to wear any clothes having metal or bone buttons; nor are they permitted to have in their possession matches, jack knives, or any metal whatever. Employees are frequently searched during work to make sure these regulations are being obeyed, and any infraction means dismissal.

Rules are posted in every building, regulating the quantity of explosives permitted in that building at one time, the number of operators allowed, the methods of operating, the kind and number of tools permitted, and citing the necessary precautions to be taken to minimize the chance of accident.

As a safety precaution, the manufacture of explosives is carried out in several stages, each in its own house, and separated from the other buildings by a distance of 300 ft., each building being barricaded by mounds of earth extending up to the eaves of the building. These mounds are to prevent the lateral projection of missiles in case of an explosion in any of the individual buildings.

The above broad description of the manufacture of explosives will indicate the care and the safety precautions that are taken and also the very important part played by the staff of chemists who check up the different processes. To operate an explosive factory without chemists would be as impossible as to operate a mine and mill without assayers or assays.

The explosives discussed in this paper are those in which the explosive base consists of nitro-glycerine, nitro-glycerine in combination with gun cotton, or nitro-glycerine in combination with ammonium nitrate. They are known as "high explosives" as distinct from blasting powders or low explosives.

It was not many years ago that users of explosives had a very limited variety to choose from; in fact blasting powder and one or two grades of N.G. dynamite covered the production. As to some of the old dynamites, anyone using them now would think they were going through a gas attack in which there were a considerable number of duds. The improvements in high explosives have been many, but they have been gradual, and they are due to the knowledge and ability of specially trained men. New explosive ingredients have been discovered, which, when added to nitro-glycerine, result in better and safer explosives, and the different steps in the manufacture are now under the supervision of experts, so that the finished product to-day is one that can be depended on for constant strength and reliability.

In the manufacture of high explosives, and in making improvements in explosives or producing new explosives, the main points to be considered are, safety in use, strength, adaptability for certain kinds of work, stability, and cost.

The danger in the use of explosives is due to their liability to premature explosion owing to receiving a sharp blow or shock; to leaking of nitro-glycerine owing to the use of improper absorbents or to exposure to moisture; to too high a thawing temperature; to defects in manufacture; or to getting on fire and then exploding.

To lessen the liability of danger from handling, ingredients other than nitro-glycerine are mixed with the N.G. and the result is an explosive of equal strength, but less sensitive to shock or fire. At the same time care must be taken that the sensitiveness is not so far reduced that the whole charge will not explode, thereby unexploded powder in the drill holes or chamber.

In the case of straight nitro-glycerine dynamites, the marked strength shows the percentage of nitro-glycerine contained. Thus a 40% N.G. dynamite contains 40% by weight of nitro-glycerine; a 50% N.G. dynamite contains 50% N.G., and so on. With gelatines, such as forcite, and with ammonia dynamites, on the other hand, the marked strengths do not mean that they contain the marked amount of N.G., but that other explosive ingredients have been associated with N.G. in such quantities that, when used in similar weights, these explosives develop the same energy as an equivalent grade of straight dynamite, though with different velocities of detonation, etc., which make them better than straight dynamites under certain conditions.

The relative "stability" of an explosive depends upon its ability to stand storage for a reasonable length of time without inclining to spontaneous combustion, losing strength, or otherwise deteriorating.

The principal explosives used in Canada to-day are nitro-glycerine dynamite; forcite (a gelatine dynamite); and ammonia dynamite. In the first the main explosive force is nitroglycerine alone; in forcite, it is nitro-glycerine and gun cotton, and in ammonia dynamite it is nitro-glycerine and ammonium nitrate. Before the war, explosives of the chlorate and nitro starch classes were manufactured in Canada. These explosives were used to a certain extent, though they are not so strong as the higher grades of dynamite, forcite or ammonia dynamite.

N.G. dynamites, forcite and ammonia dynamite are made in two varieties, "straight" and "low freezing" or "polar." Nitro-glycerine explosives of the "straight" variety, whether N.G. dynamite, forcite or ammonia dynamite, will begin to freeze at about 45 deg. F. To overcome this as far as possible, "polar" explosives are made. In polar N.G. dynamite the freezing point is lowered about 15 deg., so that it will begin to freeze at about the same temperature as water does. In polar forcite and polar ammonias the freezing point is lowered about 35 deg. The strength of the polar grades is the same as that of the straight grades. The exact

freezing point of polar explosives is uncertain and liable to variation. They have been used without thawing on open work where the temperature ran from zero to 6 deg. below zero for several days, they are known to have remained thawed after being exposed to a temperature of 10 deg. to 15 deg. below zero for over a week. again, they have been found frozen at a temperature of 8 deg. to 10 deg. above zero. From our experience in Canada we believe they will stand a temperature of from 10 deg. to 15 deg. above zero before freezing. and I could quote several cases where they have been soft, and were used without thawing, after exposure for several days to a temperature below zero.

The advantages of a polar explosive in the spring, autumn and winter are apparent for either mining or outside work. Their use does away with the necessity of thawing during five months of the year, when straight explosives have to be thawed. Almost anywhere in Canada polar explosives need not be thawed before the middle of November, nor after the middle of March, while with a straight explosive thawing should begin about the first of September and continue until the end of May, on account of the cold nights. Again, in some mines the underground temperatures are below 45 deg. F., and straight explosives will chill and freeze if kept there any length of time, with the liability, if used in this condition, of missed holes, burned holes, or partially exploded charges, which are both dangerous and expensive. Such powder must be returned to the thaw house and re-thawed. This does not happen with polar explosives. When polar explosives do freeze, however, they must be thawed in the same way as straight explosives.

While commercial high explosives of one kind or another are made in strengths of from 10 per cent to 100 per cent, there are certain limits which govern different forms. These limits may be due either to railway shipping regulations or to the impossibility of manufacturing a satisfactory explosive above or below certain strengths. High explosives of less than 17 per cent strength are known as "lifting powder," "railroad powder" (R.R.P.), or "Judson powder," and are used almost entirely in railway construction for large blasts.

Nitro-glycerine dynamite is made in strengths of from 17 per cent to 75 per cent, and is put up in cartridges 8 in. to 36 in. long and from 7/8 in. to 5 in. diameter. Forcite (gelatine dynamite) is made in strengths of from 35% to 85%, in cartridges 8 in. or 16 in. long and from 1 in. to 5 in. diameter. Ammonia dynamites are made in strengths of from 30% to 60%, in cartridges from 8 in. to 16 in. long and from 7/8 in. to 5 in. diameter.

While cartridges of the above lengths and diameters are made, the Bureau of Safe Transportation of Explosives places certain restrictions on the size of cartridges and percentage of nitro glycerine allowed to be shipped by freight. No explosive (except a gelatinized one) containing over 60% N.G. can be shipped by freight, also, explosives containing over 10% N.G. (except gelatinized explosives) can not be shipped by freight in cartridges more than 8 in. long and 4 in. diameter. The reason gelatinized explosives are excepted is that they are not so liable to leak or to be exploded by shock as are the other brands.

High explosives are graded with a 10 per cent difference in explosive content, as, 30 per cent, 40 per cent, 50 per cent and 60 per cent, and this grading has proved satisfactory to users of explosives. During war time the Canadian Explosives, Limited, at the request of the Government, in order to conserve raw materials and to assist customers to reduce costs, offered to make 35 per cent, 45 per cent and 55 per cent strengths. These were tried out quite extensively in some of the mines, in certain cass they were successful and are still used.

The energy developed by an explosive depends on the amount of gas liberated on explosion and on the temperature of the gas. The work done depends, in addition to the above, on the velocity of detonation, or the quickness with which the gas is liberated. Speaking broadly, the higher the velocity of detonation the more shattering effect an explosive has, and the lower the velocity of detonation the more heaving and less shattering the results. Considering equal grades, N.G. dynamite, on account of its high velocity of detonation, is the most shattering of the commercial explosives; then come ammonia dynamites, then gelatine dynamites or forcites. Velocity tests are made in the open as there is no way to make such tests with the explosive confined, as in a drill hole.

The tendency of users of explosives in Canada today, particularly in mining, is to use the lowest strength explosive that will break their ground when it is properly drilled. Up till a few years ago considerable amounts of "gelignite" (a 75 per cent N.G. explosive) were used in the mines in Porcupine, Cobalt and British Columbia, but this has been replaced by 60 per cent, and often 50 per cent, explosives and a lowering of costs has followed. To-day by far the largest proportion of high explosives used in the mines of Canada is of 40 per cent strength, while little 60 per cent is used. This is due not only to the more careful supervision given to the use of explosives, but also to the fact that greater care is taken to see that the drilling is done properly.

In choosing an explosive for mining work the following considerations are important: Safety in use, breaking strength, minimum of injurious fume and smoke, and stability. It is also of advantage to use one kind and strength of explosive throughout the mine. After these considerations come points such as nonfreezing, plasticity (which allows the explosive to "stay put" in a hole, filling it completely when tamped, so that it does not run out of an upper when the cartridges paper is split), and cost.

Until such time as the Dominion Government, establishes a Department of Explosives with a testing station, the best a user of explosives can do towards deciding as to the safety or otherwise of an explosive is to take into consideration the standing of the company manufacturing the article from which standing he must judge how much weight can be attached to their assertion that the explosive is as safe to handle as it is possible to make it, and still have it explode when wanted.

In England there is a list of "Authorized Explosives," that is, explosives which are authorized by the Home Office for use in work outside of coal mines; but in Canada this procedure has not as yet been followed, and the permission of the mine officials to test an explosive in any working rests mainly on the standing and reputation of the firm of manufacturers and the persuasiveness of the company's representative. A few facts, however, can be borne in mind. A gelatine dynamite, such as forcite, will give off less fume and smoke than either a nitro-glycerine dynamite or an ammonia dynamite. Moreover, being denser, more of it can be tamped into the bottom of the holes

where the main work is to be done, and it will stand water and storage better than either of the other two.

Nitro-glycerine dynamite will shatter the rock more than the other two, and if there is a large amount of sand blasting or bull-dozing to be done, on account of not being able to pop-hole the large rocks, it is sometimes worth while to use it and have sufficient ventilation to take away the fumes.

Ammonia dynamites are more gassy than forcite, but are cheaper and run more sticks to the case. They are worthy of consideration in a dry mine with good ventilation.

To test an explosive for breaking strength, fume, and smoke, a good deal of trouble and at times some expense must be incurred, but both the trouble and the expense are very minor considerations if it is proved that the costs can be reduced and accidents prevented.

It is generally considered that in drifting, the ground is more difficult to break than in stoping, so that an explosive which will pull the drift rounds will be satisfactory in a stope. It is also more easy to judge the fume and smoke after a blast in a drift than in a stope, as the gases have not the same chance to get away. An average drift, therefore, should be chosen for the test, and the best machine men in the mine should be used to drill the rounds for testing the explosive. The standard round for the mine should be used and an official should examine each round before it is loaded, and note whether it is properly drilled or not, for it is evident that if a poorly drilled round breaks well, too strong and, therefore, too expensive an explosive is being used; while if the break is a poor one a notation that the round was poorly drilled may prevent the proper explosive from being condemned. A test of this kind should last from one to four weeks. The distance driven should be carefully measured and the cost of explosives per foot advance figured out and compared with past records.

Testing for fume and smoke is usually done by entering the drift a reasonable, and sometimes an unreasonable, time after blasting, and seeing how close to the the face one can get before the gas becomes too bad. This is neither comfortable nor safe. The best way is to enter the drift protected by a gas mask, and take samples of the air at various distances from the face, and have them analyzed for injurious fumes. During the test care should be taken that the same ventilation is operating under the same conditions after each round of the test.

It should also be the duty of some official to see that the explosive is well thawed when used, that a careful record is kept of the amount used, and that the holes are well tamped. An explosive which is successful in a drift test can then be tested in stoping, and if satisfactory can be used throughout the mine, with the knowledge that the best and most economical explosive has been adopted.

Stability, which is the quality of standing storage in good magazines, as well as a reasonable temperature in a thaw house, without leaking or deteriorating, can be checked as the test goes on.

Opening or developing a mine is done through a shaft or adit, and for this work a stronger explosive should be used than is necessary when a large amount of stoping is done. Not only are shaft rounds particularly hard to pull, but the speed with which the mine has to be opened up makes a strong explosive advisable.

When the percentage of explosives used in stoping is much larger than that used in drifting or sinking, a poor drifting or sinking round may be overlooked rather than use two grades of explosives; but when speed is a large factor it is expensive and annoying to have badly broken rounds.

To use explosives economically, the following points must be carefully watched:

The explosive must be well thawed, not only before it goes into the mine, but when it is loaded into the holes.

Use strong blasting caps. The stronger the cap, the better and quicker the charge is exploded. More work is done, and slight defects, such as insensitiveness, due to chilling, freezing, or long storage, are overcome with a No. 8 cap much more than with a No. 6. While a No. 8 cap is more expensive than a No. 6, it contains double the detonating charge. In lead block tests the No. 6 shows an expansion of 755%, the No. 8 of 1,215%; or, when detonated in the lead block, the No. 6 enlarges the cavity from 2 c.c. to 17.1 c.c., the No. 8 from 2 c.c. to 26.3 c.c.

The explosive should be well tamped. At least one foot of stemming should be used; two feet is better.

All loading and blasting should be done by a blaster or a blasting crew.

Uusing frozen or insufficiently thawed explosive is not only wasteful, but dangerous, as not only does powder in this condition do from 15% to 50% less work than it should, but missed holes occur and unexploded power is found in the bottom of the holes; both are a source of danger, the last especially.

When re-blasting is necessary it means, in most cases, either that the wrong kind of a round is being drilled; or that the round is improperly drilled; or that the wrong kind or grade of explosive is being used. Occasionally change of the rock is the cause, but the above-mentioned reasons apply in a great majority of cases.

Re-blasting old holes is very wasteful, the holes are enlarged at the top, and the rock is more or less cracked and shattered. It is frequently not much better than sand blasting or bull-dozing. If a close watch of the explosive consumption is kept at a mine which does much re-blasting, it will be found that from 15% to 20% of the explosive used in drifting goes for this work.

The use of good stemming will considerably increase the work done by explosives, and I think it is not too much to say that in mining work the increase would be 15%. In other words, the load in a hole can be reduced from 7 sticks to 6 if good stemming is used. With 40% forcite and $25.00 per 100 lb. this is equivalent to a saving of over 3 cents per lb.

While many of the larger mines have blasting crews it is rarely that a special blaster is thought worth while at the smaller ones. This I think is a mistake. When this paper was written (December, 1918) the price of 40% forcite at the mills was $25 per 100 lb. in carload lots of 360 cases or over. This figures out at 15 cents a stick. A mine could afford to pay a blaster $100 a month if he could save 30 sticks of powder a day, and at the same time there would be an actual saving in costs.

The economical use of explosives is one of the questions that is occupying the attention of every mine manager. The field is a large one, and the time allowed for a paper does not permit going into too much detail. The writer, therefore, has thought best to bring up the points that one meets in every-day mining, and where any saving that can be made is tremendous when spread through the industry.

Special Correspondence

BRITISH COLUMBIA.

New Ore Treatment Rate Schedule at Trail, B.C.

Reference has been made to the dissatisfaction of the independent shippers of British Columbia with the treatment charges of the Canadian Consolidated Mining & Smelting Co. at its Trail Smeltery as set out in what is known as Schedule B. This, it will be recalled, led to an investigation by a special committee having authority from the Dominion Government, the report of which was issued a short time ago. The matter was discussed at a recent Mining Convention at Nelson, when it was announced by J. J. Warren, the company's General Manager, that a new schedule was being prepared and would be issued shortly. That schedule, Schedule C, now has been published and is effective. It provides the promised reduction in ore treatment rates and more especially affects those ores containing percentages of zinc and sulphur. The schedule is as follows, the introductory table being the basis of payment for silver and lead:

	Silver Payment.	Lead Payment.
10% zinc or under.	95%	90%
Over 10% and including 11%	94½	89
" 11 " 12	94	88
" 12 " 13	93½	87
" 13 " 14	93	86
" 14 " 15	92½	85
" 15 " 16	92	84
" 16 " 17	91½	83
" 17 " 18	91	82
" 18 " 19	90½	81
" 19 " 20	90	80
" 20 " 21	89½	79
" 21 " 22	89	78
" 22 " 23	88½	77
" 23 " 24	88	76
" 24 " 25	87½	75

Silver:—Will be paid for the extent shown by the above schedule on the fire assay at the average of the Engineering and Mining Journal, New York, quotations succeeding the date of sampling at Tadnac, B.C. In no case will the deduction from the silver assay be less than one-half (.5) oz. per ton.

Leads—The lead contents will be determined by the wet method of analysis deducting one and one-half units to arrive at the dry lead assay. Lead will be accounted for on the dry lead assay to the extent shown by the above schedule; provided, however, that in no case will the deduction from the said dry lead assay be less than one unit or twenty pounds per dry ton of ore.

The price for lead to be used in settlement will be our sales price delivered at destination in Canada less one and one-half cents per pound for refining and marketing as now in effect under the existing pooling scheme, which will be continued. There will be deducted also from the delivered sales price, $2.30 per ton on sales at Toronto and common points and $4.50 at Montreal and common points and similar differentials to other points. This freight adjustment is to cover actual increases in freights, e.g., should sales in any month be 2,000 tons and say 1,200 tons for delivery at Toronto and 800 tons at Montreal, the freight adjustment would be 3-5ths at $2.30 and 2-5ths at $4.50, or $3.18 per ton of lead.

The pooling scheme is outlined as follows:

(a) Settlement is based upon sales price as above provided and only to the extent of actual sales from month to month.

(b) Whenever sales are sufficient to settle for a full month's lead receipts this is done promptly.

(c) Lead from our own mines is pooled with that purchased from others, and is treated in exactly the same way.

(d) Each month a statement is issued showing the condition of the pool. All shippers have been sent a copy of the last one issued.

Deductions.

Smelting per dry ton of material nine dollars and fifty cents as a base rate, which will be modified in accordance with the following formula:

(1) Add to the base rate per ton, 60 cents per unit for all zinc contained.

(2) Deduct from this result the total units of silica, iron, manganese, lime and magnesia at nine cents per unit.

Provided that in no case shall said base rate be reduced more than $4 per ton as the net result of the said additions and deductions.

Provided also, that in making the above computation, iron, silica and lime if 1% or under, and manganese and magnesia if 3% or under, will be disregarded.

Sulphur:—A charge will be made in addition to the above for all sulphur contained in excess of two per cent. at thirty cents per unit per dry ton of material, provided that such charge shall not exceed three dollars per ton in any case.

Moisture:—A minimum moisture deduction of ¼% will be made. The following penalty for moisture will apply to fine concentrates and clayey ore only.

If over five per cent, charge for all contents at ten cents per dry ton per unit.

Size:—Coarse and fine concentrates and ores should be shipped separately. If mixed so that over 30% will pass through a ¼ inch screen, an extra charge of fifty cents per ton will be made.

Sampling:—If the shipment is less than a car lot or contains more than one lot per car, a deduction may be made for extra sampling, assaying, etc., of $10 per lot.

Weights and Samples:—To be used in settlement shall be those made at the smelter.

Representation:—Shippers are expected to notify us as to who will represent them while their shipments are being weighed and sampled. Failure to do so will be constructed as meaning that the smelter will have authority to appoint one of the local mine representatives at the shipper's expense unless the local shiper notifies us that a representative is not required.

Assays:—Shippers will supply the smelter with their assays on smelter pulps shortly after sampling. In case of difference in assays requiring it, the umpire pulp will be referred to an umpire mutually agreeable. The party whose result is farthest from the umpire's result, will pay his fee.

Settlement:—(a) Shortly after sampling an advance payment of 90 per cent of the apparent value is made. The prices used in estimating the apparent value will be the New York price for silver and the Montreal price for lead of the date of sampling.

(b) When final settlement is rendered possible by silver quotations being available for the second calendar month after sampling and by all of the lead received during the calendar month in which the ore is sampled, having been sold, the final value will be computed and any adjustment necessary will be made between the smelter and mine.

(c) Advances made on account will be carried by the smelter without interest until the last day of the second calendar month in which the ore arrives. Interest at 6% will be charged on advances upon lead after that date.

The above rates will be effective on shipments received here on July 1st, 1919, and are subject to change without notice.

Ore Receipts at Trail.

Ore was received at the Trail (B.C.) Smeltery during the week ending June 30, 1919, as follows:

Mine—Location.	Gross Tons.
Centre Star, Rossland	1,262
Florence, Princess Creek	134
Josie, Rossland	236
Molly Gibson, Kitto Landing	25
Mandy, Le Pas	94
No. 1, Sandon	46
North Star, Kimberley	173
Sally, Beaverdell	26
Sullivan (zinc), Kimberley	4,241
Sullivan (lead), Kimberley	468
Total	6,705

Minister of Mines' Annual Report.

According to the Annual Report of the Minister of Mines for the year 1918, which has just been issued, the value of the mineral production for that period was $41,782,474.00. The preliminary report published early in the year estimated the valued production at $41,083,093.00. It will thus be seen that the officials of the Provincial Bureau of Mines were not far astray in their prediction of the monetary value of minerals produced during the past twelve months.

The report is in every respect a credit to the Department. It comprises many interesting tables of statistics and is well illustrated. Referring to the shipping mines of 1918 it is pointed out that there were 2,892,849 tons of ore shipped; that the number of mines shipping was 175; ;that the number of mines during the year shipping over 100 tons was eighty, and that the number of men employed above and below ground was 4,148. Figures show that coal mining produced has produced more than any other separate class of mine, a total of $187,147,653. Next in importance is copper, the value of which is placed at $145,741,069, and the next in order is lode gold at $97,121,786, while placer gold takes fourth place at $75,436,103. These, of course, are the gross values of the repective minerals mined in the Province up to the end of the past year.

The production of placer gold during the year decreased to the extent of $176,000, but an increase is indicated in the output of lode gold of $1.036,622, making a total increase of $860,622. The amount of silver produced was $3,498,172 oz., having a gross value of $3,215,870, an increase in the number of ounces of 568,956. In 1918 the output of lead was 43,899,661 pounds, valued at $2,928,107, which is an increase over the production of the preceding year of 6,592,196 pounds, but a decrease in value of $22,913 due to the drop in price of metal. Copper production totalled 61,483,754 pounds, valued at $15,143,449, an increase in amount of 2,476,189 pounds, or about 4.2 per cent. The value of the product was less than that of the previous year by $894,807, a decrease of nearly 8 per cent due to lower prices. The total tonnage of ore mined in the Province during the year was 2,892,849 tons, having a gross value of $27,590,278, and with the placer gold a total value of $27,910,278. The following table shows the tonnage derived from the various districts of the Province:

Cassiar-Omineca District	963,260
Southern Coast District	745,169
Boundary-Yale District	723,403
Slocan Mining Division	142,700
East Kootenay District	141,570
Train Creek Mining Division	112,349
Ainsworth Mining Division	44,937
Nelson Mining Division	15,348
Other Mining Divisions	4,113
Total	2,892,849

The conditions as to operations in connection with the various metals are dealt with, gold being the first considered. Production of placer gold is pointed out was about $320,000 as nearly as can be ascertained, there being considerable difficulty in obtaining exact figures. Placer gold mining is confined almost entirely to the Atlin and Cariboo Districts, 96 per cent of the total coming from these two sections. As to hydraulic placer mining, from which about 90 per cent of the placer gold obtained in British Columbia is derived, it has been well demonstrated that the gold output is in direct proportion to the number of days in which the water is available for piping. In touching upon lode mining the increase for the year of $1,036,622, or about 43.7 per cent, is explained as being largely due to the entry into the producers list of a new mine, the Surf Inlet Property of the Belmont Surf Inlet Mines, which made an output of about 411,600 ounces. Silver produced during the year represented an increase in value of $950,121, which was partly due to the high price of the metal. The Slocan District led all other sections in the production of this metal. As to lead, it is shown that the production was increased in the Fort Steele, Slocan and Windermere-Golden Districts, and decreased in the Ainsworth and Nelson District. It should be remembered that the Sulivan Mine of the Canadian Consolidated Mining and Smelting Company is located in the Fort Steele Division. Usually it contributes uearly all of the Division's output but last year over 860,000 pounds cames from the North Star mine. Dealing with copper the report mentions the very large production of the Hidden Creek Mines of the Granby Consolidated Mining and Smelting Company in the Skeena Division, and of the Britannia Mine in the southern coast district. In discussing the Granby Company's mines at Phoenix in the Boundary District it is said that they were unable to supply the smelter at Grand Forks with sufficient ore to run the smelter at capacity. "The ore reserves at these mines" the report continues, "are approaching exhaustion so that the large scale production of former years cannot be maintained. Also the high operating cost during 1918

left but little margin of profit in working the low grade ores at Phoenix." The recent closing down of the Phoenix mines and the Grand Forks Smelter bears out the conclusion to be drawn from the foregoing observations. As to the Canada Copper Corporation's operations at Greenwood, it is stated that the Mother Lode Mine contributed to the smelter there a slightly smaller tonnage than in 1917. About 154,000 tons were handled from which 1,832,382 pounds of copper was recovered, together with lode gold and silver contents. Towards the end of the year the smelter was closed, the ore reserves at the Mother Lode Mine being exhausted.

The following table shows the production of copper according to districts:

	Lbs.
Skeena Division	30,190,606
Southern Coast District	18,475,013
Boundary-Yale District	9,940,125
Trail Creek Division	1,654,356
Omineca Division	543,843
All others	579,811
Total	61,483,754

The zinc production of 1918 amounted to 41,772,916 pounds compared with 41,848,513 pounds in 1917. The value of this production is placed at $2,899,040. The following table shows the production of zinc according to districts:

	Lbs.
Fort Steele	26,704,806
Slocan	14,107,682
Omineca	313,112
Ainsworth	640,991
All others	6,325
Total	41,772,916

Thus an increase over 1917 is shown in the Fort Steele District of nearly six million pounds, which output comes entirely from the Sullivan Mines, the ore being treated in the Electrolytic Zinc plant at Trail. In the Slocan District the heaviest shipper was the Standard with a production of over seven million pounds.

Taking up other minerals the report discusses iron ore, stating that it has been strongly advocated in many quarters that the conditions are favorable for the establishment of an iron smelting plant somewhere on the British Columbia coast. So far nothing definite has materialized, although there is apparently a prospect of such a plant being established on this coast. As is well known there is on the coast in the aggregate an adequate supply of magnetite iron ore quite sufficiently free from impurities as to be within the "Bessemer limit" to supply ore for such a plant.

Dealing with coal, it is shown that the gross production of 1918 was 2,578,724 long tons, of which 276,479 tons was made into coke, leaving the nett production at 2,302,245 tons. These figures show an increase as compared with 1917 of 180,009 tons gross, and of 152,270 tons nett. The quantity of coke made was 188,967 tons, which is an increase of 29,062 tons over 1917.

The report then goes on to give an outline of conditions during the year in the six mineral survey districts by the resident mining engineers of those districts. Generally speaking they show that the mining industry over that period was in a very satisfactory state and that gratifying development may be expected.

GRANBY BEGINS TO PRODUCE COKE AND BY-PRODUCTS.

On July 11, the Granby Consolidated Mining, Smelting & Power Company began to produce coke and by-products in their coke ovens at Anyox. The big plant, which is the only one of its kind on the Pacific Coast, has been two years in preparation and is now in full operation.

Coal for the thirty-two ovens is supplied from the Granby's properties at Cassidy, Vancouver Island, from which steady shipments have been made to the northern smelter town for several weeks past. The coke produced is said to be of excellent quality and continued operation is expected.

The by-products of the coke plant include toluol, benzol, sulphate of ammonia and coal-tar, for all of which there is a consuming market. The coal-tar will be shipped to Vancouver to be fractioned into pitch and creosote, and will provide British Columbia points with a dependable product.

FORTY-NINE ON SALMON RIVER SHOWS HIGH RETURNS.

The work at "Forty-Nine" will begin the week, commencing July 5th, under the direction of Harry Howson, formerly of the Payne Mine in Sandon.

Silas Silverman, representative of his father, Sam I. Silverman, was expected to arrive also, but had to return to Seattle from Ketchikan.

This property was bonded a few months ago by Chas. A. Caldwell, Harry Howson and Sam I. Silverman and has a splendid showing.

The "Forty-Nine" lies just east of the Yellowstone group, on Salmon River. The locators were Dan and Andy Lindeborg. Three cuts showing an average vein width of twenty feet is the extent of the development. The highest open cut is thirty-seven feet wide and shows eight feet of fine looking ore. A recent assay went $359. in silver and $120. in gold to the ton.

During June Mr. Frederick W. Bradley, President of the Bunker Hill and Sullivan Silver-Lead Mines of Coeur d'Alene, Idaho, and head of the Treadwel Mines at Juneau was in Dawson and went on to Mayo to look over the silver properties there. Mr. Bradley was accompanied by Mr. Thomas McDonald, Mining Engineer.

Mr. F. Wernickie, Geologist for the Alaska Juneau Mine and other properties in which Mr. Bradley is interested, was also in the Yukon looking over properties.

Alex. McLeod, one of the pioneer mining men of British Columbia, died at the Kootenay Lake General Hospital, Nelson, recently. He had been in the Ainsworth District for more than 35 years. The Tam o' Shanter silver-lead mine was owned by Mr. McLeod and, while it is not producing at present, the deceased had been doing his assessment regularly and had confidence in the property. Among the properties on which he worked since coming to the Province were the Blue Bell Mine at Riondel, the No. 1 Mine at Ainsworth and the Highland Mine at Ainsworth.

NORTHERN ONTARIO.

The Cobalt Strike.

Cobalt, in the afternoon of the 23rd of July, witnessed the spectacle of a thousand men on "strike" parade. Since when not a wheel has been turning at the mines. The pumps have been withdrawn from underground and the industrial war which has threatened the camp since early summer is at last a reality. The die has been cast, twenty-two hundred men have ceased to work, a pay-roll of close to $300,000 monthly has ceased. Merchants and business are being hit hard locally, manufacturing concerns to the south are suffering, and the country as a whole is losing the benefits heretofore accruing from the production of from $40,000 to $50,000 worth of silver every twenty-four hours.

Among those affected there does not appear to be a very favorable opinion of the ability of Senator Robertson, Minister of Labor, at Ottawa, as demonstrated in the manner in which he handled the situation. It is even intimated that he blundered hopelessly.

As to just how long the labor strike will last, it would be extremely difficult to hazard an opinion at this time. As to where the entire responsibility rests perhaps no one individual could be singled out, and it would be folly to condemn the efforts of any man.

The great pity is that hundreds of men who can ill afford to be out of work for any very great length of time are now idle. Already the second-hand dealers are doing increased business, including the purchase of jewellery from individuals who declare they are disposing of excess personal belongings so as to pay for transportation to other districts.

The Union is keeping pickets at work, but the work in this direction is slight, due to the fact that no attempt is being made to operate the mines. Instead, as previously stated, the underground workings are being permitted to flood with water.

General opinion appears to be that the strike will not be of long duration, but as to this it would be impossible to intelligently forecast. At worst, the cost of closing down, and, at some future date, the cost of pumping out may represent the sole loss to the shareholders of the various companies. There is even a possibility that the elimination of the usual silver output from the mines of Cobalt might cause the quotations for silver to increase sufficiently to offset the expense incurred. Should this prove to be so, the present period may be considered but a lull in the prosperity of the mines.

Situation in Porcupine District.

The impression seems to be that the mine workers in the Porcupine district will abide by the decision recently reached whereby the mine employees and the mining companies will co-operate in an endeavor to reduce the cost of living. This plan, provided it proves succesful, bodes well for the Porcupine mines, and the great gold field may reasonably be expected to attract mine workers in abundance, a condition which has not existed since the second year of the recent war. The labor strike at Kirkland Lake continues. In the Boston Creek district, as at Porcupine, operations are proceeding without interference.

Late advice from the Porcupine district indicates the likelihood of the Hollinger, McIntyre-Porcupine, Dome Mines, and Porcupine Crown adopting some satisfactory method of protection by insurance against sickness by which the men will receive indemnity equivalent to half-pay.

The arrangements for opening a co-operative store are in full swing. A. F. Brigham, General Manager of the Hollinger, together with R. J. Ennis, General Manager of the McIntyre-Porcupine are giving the matter their personal attention and in this connection they visited Toronto a few days ago.

It is understood the men who represented the employees at the conference with the mine managers presented the outline of the arrangement to a meeting of the Union and the plan was endorsed by a large majority.

So far as can be learned, mining operations in the South Lorrain district are not being interfered with by the labor strike in Cobalt, the management of the properties not having been notified as to any demands from the union.

The Pittsburg-Lorrain and the Keeley are the only two properties being worked in a small way.

A shortage of labor continues to retard progress in the Porcupine district, in spite of the fact that about 450 men have left the Kirkland Lake camp due to the labor strike there and that in Cobalt there is a surplus of labor even before the strike. The Hollinger mine is stated to have a less number of men on its present pay-roll than the number employed before the Kirkland Lake strike was called. Just where the mine workers have gone from the Kirkland Lake camp, and from the Sudbury mines as well, remains somewhat of a mystery. Although the readjustment is slower than had been expected, yet the change, even though gradual, is, nvertheless, inevitable. The reward, when reaped, will probably be found to have abundantly justified the magnificent patience which the average shareholder has shown.

According to reports from the Porcupine district, the Dome Mines Company is now paying $4 daily to its underground employees, this being equal to the wages being paid at the Hollinger and at the McIntyre-Porcupine.

In the Porcupine district a shortage of labor is still felt, but it showing gradual improvement, and is expected to still further improve because of the labor troubles in the Cobalt District.

Progress in the Newer Districts.

Geological surveys being made in the gold bearing districts of the North will this year provide the necessary data to prepare a geological map embracing the Kirkland Lake, Boston Creek, and Larder Lake districts.

Surveys have previously been carried out in each of the districts mentioned, but not in a manner that would permit the connection of the three fields. This year's work is expected to be of considerable value to prospectors and mining men active in the three districts referred to.

The Miller-Independence mines is proceeding with the erection of additions to its mill. It is planned to have the equipment installed and treating about 75 tons daily before cold weather sets in.

The number of drills is to be increased to about seven, it is stated officially.

Diamond drilling on the O'Donald property during the currency of an option held by the Allied Gold

Mines resulted in indicating a vein some 28 inches in width containing from $19 to $29 in gold to the ton.

The O'Donald is situated between the property of the Patricia Syndicate and the R. A. P. Syndicate. At the time of writing, further drilling is being done near the west boundary of the Patricia.

Mining interests engaged in the development of properties in the Boston Creek district continue to criticize the Ontario Government for its failure to provide a road for the benefit of the mines. It is pointed out that a definite promise was made last spring to build the road, but as yet nothing has been done. The Boston Creek camp is about the only important mining centre in Northern Ontario which has received no assistance from the government.

Some difficulty is reported in the Kirkland Lake district in regard to the construction of the macadam road from Swastika to the centre of mining activity. It is learned that it has been found less convenient to secure the desired waste rock from the mines than had been expected. As to the seriousness of the situation, and as to whether or not it is due to the mines being closed due to the labor strike has not been ascertained.

Prospectors, and particularly returned soldiers are urging that some steps be taken in an endeavor to throw the Gillies Limit open for prospecting this fall. October 1st is the date suggested. It is pointed out that after that date there is little or no danger from forest fire and that prospectors would have time to explore the surface of their claims and conduct further exploration work during the winter by the sinking of test pits. This would aid the prospector, and provide work for quite a number of men, in addition to being of much benefit to merchants and business men in the Cobalt district. It would also result in a substantial revenue for the Province in claim recording fees. Hon. G. Howard Ferguson, Minister of Lands, Forests and Mines, is expected to lend a sympathetic ear to the proposal.

Favorable assays as a result of a careful sampling of the Hull-Kipper claims in the Tashota section of the Kokwash gold area has attracted considerable attention. The mineralized dike is stated to be upwards of two hundred feet in width, with a section some fifty feet in width containing a large tonnage of low-grade ore. Although some of the mining companies operating in Northern Ontario have endeavored to secure the property on a working option basis the present owners have not consented to deal along such lines. Big interests have endeavored to secure an option of sufficient length to permit a thorough exploration of the property by diamond drills.

Gold in the Aguinica Mine.

The discovery of visible gold in ore taken from the old Aguinica mine situated a little to the east of the silver producing area of Cobalt has aroused a good deal of curiosity. In the feverish hunt for silver in the early days on this property, the presence of native gold was apparently overlooked. It would appear that the gold occurs only where the vein passes through Keewatin formation. On surface, where the vein occurs in conglomerate, the filling consists of calcite containing a high percentage of cobalt mineral, with low silver values. As a depth of about 150 feet where the vein passes into the underlying Keewatin, the filling of the vein changes to quartz containing visible gold. The Aguinica is under option to one of the leading silver mining companies of Cobalt and a thorough examination of the property is being conducted.

Cassel Cyanide Co. to Incorporate in Canada.

The Cassel Cyanide Company, the most successful cyanide manufacturer in the world announced in last weeks' Journal that it will incorporate a subsidiary company in Canada. The chief reason for this important step is not difficult to find.

The mining industry of Canada, particularly Northern Ontario, is growing apace. Manufacturers of low-grade cyanide are making a strong, yet ineffective bid for the patronage of our mines. Home industry is bound to ultimately be given the preference. At least, should Canadian manufacturers be able to successfully demonstrate the manufacture of a material that could take the place of the high-grade article imported from Glasgow, Scotland, then there is every reason to believe the Canadian product would soon be filling at least ninety per cent of the requirements of the mines of this country.

As yet, the cyanide manufactured in Canada has not come into favor at the mines. Its use is more general in other directions, particularly in the fumigation of orchards and as a fertilizer. Although love for home enterprises would undoubtedly weigh the scale in favor of Canadian preference, yet no Britisher and least of all Canadians should hesitate to continue the patronage of the Cassel Cyanide Company unless or until Canadian enterprise succeeds in producing an article that can closely compare in quality with the high-grade material now being imported from Scotland.

At the outbreak of war a large amount of cyanide used in the British Empire was being imported from Germany. British ingenuity was taxed to the full limit of its powers to meet the situation. Gold mines everywhere faced the possibility of not being able to operate. All eyes in the Empire turned to the one hope —the Cassel Cyanide Company. The Germans lauded their alleged cyanide monopoly as one of the weapons that would win the war. They reckoned without the ingenuity of the bull-dog breed. The Cassel Cyanide Company not only succeeded in supply the requirements of the mines in the British Empire at almost normal prices, but permitted the export of the limited quantities to allied countries.

Canada, therefore, is glad to welcome the incorporation of a subsidiary company in this country. If the move is backed by similar enterprise as that which defied the alleged German monopoly, then the Canadian manufacturers will be compelled to put forward the best efforts to carry on successful competition.

A cyanide test is being conducted at the ore-testing laboratory of the Haileybury Mining School, for the purpose of comparing the low-grade cyanide manufactured in Canada, at Niagara Falls, and the high-grade article manufactured in Glasgow, Scotland. The test will cover a period of about twenty-four days, and the result might reasonably prove to be of far-reaching importance for the Cassel Cyanide Company of Glasgow, or for the American Cyanimid Company, of Niagara Falls, N.Y.

T. J. BROWN.

General Superintendent, Nova Scotia Steel & Coal Co., Sydney Mines, N.S.; Member of Council of the Mining Society of Nova Scotia, and recently appointed Chairman of a special committee of the Canadian Mining Institute to consider the formation of a Coal Mining Section of the Institute.

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The Cost of Coal Production as Influenced by the Balancing of the Working Organization

(From Iron and Steel of Canada)

The initial cost of fuel very gravely and intimately concerns manufacturers and fabricators of iron and steel, and at the present time the high costs of mining coal are probably the chief deterrent to lower prices for iron and steel products.

Prominent among the reasons for the increased expenditure required to produce coal is the unbalanced condition of the working forces at the collieries, primarily due to the requirements of military service.

At the collieries in Nova Scotia voluntary enlistment acted in a very discriminating manner, because by a natural selection there was attracted to the colors the very pick of the productive forces at the collieries. The specifications of military fitness, which as is well known were more exacting in the early months of the war than was the case later, encouraged the selection of young men, physically vigorous; and, by a similarly discriminating process, voluntary enlistment chose the men of mental and spiritual energy. The effect of all this upon the colliery organizations was extremely partial, because, in the first instance, the nature of underground employment tends to create two fairly sharply divided classes of workers, in the first of which classes, usually known as the "producers" will be found the young, vigorous and more ambitious workers employed chiefly at the "face" where the actual digging of coal takes place. The second class, namely, the so-called "non-producers," include the shiftmen, repairers, haulage attendants and the surface workers, and these men are, broadly speaking, made up of boys too young for work at the coal-face, and older men past their prime, or unfitted by capacity or inclination for actual production of coal. Among the first-named class are also to be found a large percentage of young married men, because the miner reaches his maximum earning capacity in early manhood, and he usually marries early.

The effect of voluntary enlistment was therefore to greatly reduce the numbers of the producing class, and to reduce very slightly, or not at all, the non-producing classes. The financial result was inevitable, seeing that the tonnage of coal produced sharply declined without any diminution of the overhead charges and the cost of taking the coal away from the face. This unbalancing of the working forces at the collieries has been, and still is the main factor in increasing the production costs of coal.

Apparently this phenomenon is not peculiar to Nova Scotia, and, with the close of the war, some figures are available from British sources showing that a similar cause has operated to raise the production costs in Great Britain. The following figures, condensed from some informative tables compiled by Mr. Finlay A. Gibson (Secretary of the Monmouthshire & South Wales Coal Owners' Association) compare the annual coal production of the United Kingdom for 1913 and the war years, with the number of workmen on the surface and underground, and show the percentage of increase or decrease from the standard of 1913:

A study of the table will show that while the production of coal in 1918 fell to 21 per cent below that of 1913, the number of workmen employed on the surface was only lessened by two per cent.

If it were possible to still further separate the figures of the underground workers into face-workers and the remaining classes, it would undoubtedly be apparent that the entire reduction, or nearly so, would be found in the number of the workmen employed at the coal-face.

Read in conjunction with the foregoing tables, Sir Auckland Geddes' recent announcement in the House of Commons that the production of 1919, owing to the reduction of the working hours to seven hours per day, would not exceed 214,000,000 tons, and that the number of workmen engaged in the industry is now equal to the average of 1913, namely 1,111,000 men, it is quite clear that the cost of coal in Britain must be rapidly increasing.

There is no data available on which to institute comparisons with the United States in this connection, but, as that country was able to learn from our experiences, and was able to organize for war under a selective draft system that avoided the dislocation of pivotal industries, it was also able to avoid the unbalancing of the colliery organizations to the same extent as occurred throughout the British Empire as a whole. There was some little inconvenience in 1914 when British citizens and citizens of other belligerent countries went home in large numbers from the United States coal districts, but between that date and the entry of the United States into the war the colliery forces had been recruited to normal strength.

During the war period, the United States took advantage of its unparalleled resources of coal, and increased coal production in a really marvellous fashion, and that it was able to do so, was largely due to the fact that the selective draft recognized the necessity to retain coal producers at their work.

The larger steel companies of Canada are all miners of coal for their metallurgical processes, and there is probably no department of their operations which is

			Workmen Employed.					
Year.	Tons.	% *	Underground.	% *	Surface.	% *	Total.	% *
1913.....	287,441,869	..	909,834	..	218,056	..	1,127,890	.
1914.....	265,643,030	— 7	915,381	— 1	218,365	..	1,133,746	..
1915.....	253,179,446	—12	754,673	—17	198,969	— 9	953,642	—15
1916.....	265,348,531	—11	792,911	—13	205,152	6	998,063	—11
1917.....	248,473,119	—13	811,510	—11	209,830	— 4	1,021,340	— 9
1918.....	227,714,579	—21	794,843	—13	214,024	— 2	1,008,867	—10

* Denotes percentage of increase or decrease compared with 1913.

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more important in its bearing on their ability to compete in the steel markets than the question of economical organization at the collieries for the production of coal.

It is perhaps some little consolation to know that similar factors of increase in cost are operating in other countries, or otherwise Canada would be placed at a serious disadvantage. The inclusion in the draft fo the League of Nations of the clauses relating to labor and the hours of work may yet serve to safeguard those allied countries where the rate of production is being decreased and the cost increased by the adoption of greatly shortened hours of work.

Burnett & Crampton, Rigaud, Que., contemplate building a new foundry capable of turning out about 250 tons per month of castings and will shortly be calling for tenders for the building and equipment. The equipment will consist of molding machines, which with all other equipment will be of the most up-to-date type, and they figure on having one of the most modern foundries on the continent specializing in high grade machinery castings, cement mill and mining equipment together with a general casting business.

BRITISH COLUMBIA NOTES.

Mr. Robert A. Boyce, Mining Engineer of Cobalt, and well known throughout the Cariboo District, B.C., has lately examined some promising looking quartz prospects in the district.

During his visit Mr. Boyce was the recipient of congratulations from his Cariboo friends on his election as a Councillor of the Canadian Mining Institute.

A pack train which recently took supplies up the Illiance trail to the United Metal property, Alice Arm, could not bring out ore as planned on account of the very bad condition of the trail. Considerable work above eight mile is necessary to allowing the mines to get out ore this season. The district engineer has advised that an appropriation for this work has been requested.

After an absence from the Nelson district of a year, W. J. Elemendrof, the Seattle mining engineer has reached Kalso, to make an inspection of the Slocan on behalf of principals south of the line. His work, which will be confined to the district adjoining the K. & S. line, will consume nearly a week. Mr. Elmendorf was engineer of the Slocan Star mine during the period when that well known Slocan property was in litigation.

After two years of development work on the Rand group at Apex, above Cottonwood Lake, Nelson district, John Swanson who was in Nelson to purchase supplies, estimates that he is now within four feet of the long-sought lead, and that he may break through to it any time.

This is the property on which was found, nearly 30 years ago, at a depth of 100 feet, a piece of galena and zinc float, nearly two feet long, which contained free gold, the float assaying $1,000 to the ton. Many times Mr. Swanson came back to his old prospect, hoping to find the lead from which the float came, and at last he found it outcropping from a gulch. At first he ground sluiced from the creek and confirmed his find, striking a lime dike, which led him to expect galena.

Two years ago he started in to look for the vein at depth and started a tunnel. After going in 40 feet he struck an open seam and found that he was above the lead. He then turned to the right, and this crosscut has now gone in 40 feet, and he has struck ore, which is apparently just outside the lead itself.

The Rand group is owned by three partners, Mr. Swanson's associates being Otis Hawkins and T. Burnham.

UNITED MINE WORKERS OF AMERICA REVOKE CHARTER OF DISTRICT NO. 18, ALBERTA AND BRITISH COLUMBIA.

Because the district officials of District No. 18 of the U. M. W. of America have taken out membership cards in the "O. B. U." the International Headquarters of the U. M. W. of America has revoked the charter and announced that the district ceases its affiliations with that body. The miners in District No. 18 are at the present time on strike, and indeed the district has become notorious for its constantly disturbed condition, and its disregard of union rules. The dissatisfaction of the International Executive of the U. M. W. with the conduct of affairs in District 18 is very natural, and there can be little doubt that it would welcome the opportunity which the action of the local leaders has given to rid the parent union of an unprofitable and unruly district.

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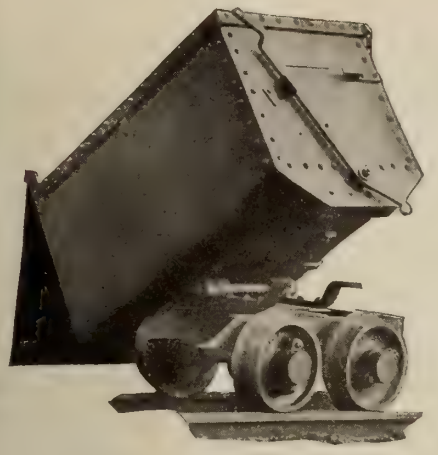

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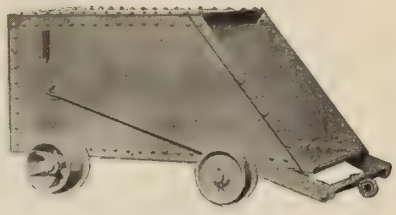

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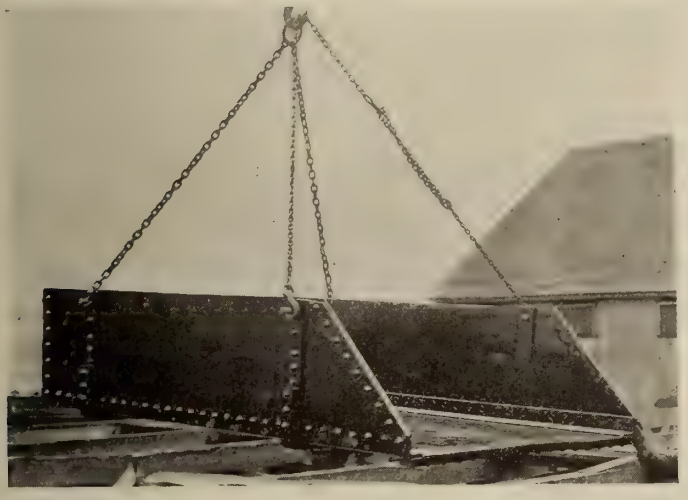

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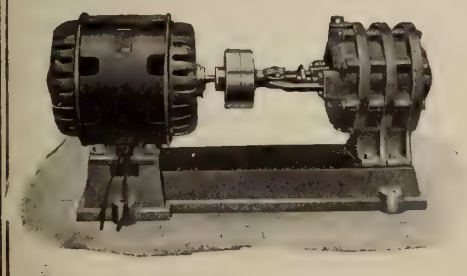

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NOVA SCOTIA NOTES.

The leaders of the United Mine Workers of America in Nova Scotia have again announced that the five days week will be inaugurated commencing 2nd August, and in making the announcement the leaders state the union is taking this step on its own initiative and that the coal operators have not been consulted thereon. This ill-considered action of the union leaders would no doubt attract more attention were there any immediate possibility of the collieries working six days a week, but in the present condition of orders and shipping it will be fortunate if some collieries can get three days work weekly. Hon. Robert Drummond, in the "Mining Record" comments ironically as follows:

"Admitted that the C. B. miners leaders' view on economics are somewhat or largely fantastic, they know what they are doing in respect of a five day week. It is not to reduce the output. It is to prove to the operators that though they have called them by times, by harsh names, they carry no ill will toward them, in fact are desirous at times to make demonstration of their good will. The five day week is not advocated for the purpose of reducing output. At the present time or rather in normal times the days worked by men did not average more than five days, if it went that high. The proposal of the executive is that instead of numbers being idle on each day of the week, the men will after the first of August all be idle on the same day. This we are sure will be received with approval by the operators. If the men all stay idle on one day and work the remainder, then the ordinary six days output is secured on a five day costs sheet. Elsewhere we state that the men won't work five days. In that event even the output, we are forced to admit, will be reduced, but the important fact remains that the costs sheets will extend over five and not six days a week. We present this view of the subject to drive off some of the gloom the five day week announcement caused, and to show that there is a silver lining on at least one side of the cloud."

It is somewhat significant that the reiteration of the five days week announcement should coincide with a semi-official explanation of the temporary closing of the Sydney Steel Plant which states that it is not unconnected with the unsatisfactory state of labor in the district, and that the unascertainable nature of the costs of manufacture due to the labor conditions at the collieries is preventing the Dominion Steel Company from making quotations for new business.

Mr. D. H. McDougall, president of the Scotia Company, has completed, for his company, the purchase from the British Ministry of Shipping, represented by Director J. B. Whyte, of New York, the coal handling plant on the Canadian National Railways terminals at Halifax. This plant is one of the most modern and efficient of its kind on the Atlantic coast, and its erection was deemed necessary by the Admiralty in order to enable the port of Halifax to take its proper place as the best and most advantageous shipping port on the North Atlantic coast.

The plant played a most important part in making Halifax the main artery of all troop transport movements in Canada during the past few months. Without this plant the Olympic, whose magnificent efficiency during the war caused her to be affectionately known by the Halifax people as the "Atlantic ferry," could not have been coaled satisfactorily. By its aid, however, this magnificent steamer has been accustomed to call and get away from the loading plant with full bunkers of 5,000 tons in three days, a performance that cannot be surpassed anywhere.

"It is therefore of considerable interest to shipping men and the whole coastal trade of North America to know that Scotia has obtained the possession and use of this splendid coal loading plant," said Mr. McDougall yesterday. "Scotia has always maintained a leading position in the bunkering business, for which its splendidly situated shipping pier at the entrance of Sydney harbor and the traditionally excellent character of old Sydney coal have especially equipped it.

"In acquiring the Halifax plant, the Scotia Company shows another instance of progressive management and farsightedness, and its action will, it is believed, be thoroughly appreciated by the people of Halifax. It is an evidence that the present management of Scotia is prepared to taken advantage of every opportunity to enlarge and improve the company's facilities for handling and disposing of its vast stores of raw material.

"The people of Halifax are to be congratulated that the growing importance of Halifax and its still greater future should be thus recognized and much significance is to be attached to the entry of such a well-equipped and experienced bunker company as Scotia upon the Halifax waterfront. Without such a plant the capabilities and possibilities of Halifax have been very much curtailed. With such a magnificent plant and the backing of the Scotia Company, Halifax is now able to offer facilities for coaling with regularity and dispatch unsurpassed by any other Atlantic seaport."

NORTHERN ONTARIO PERSONALS.

Mr. Harry Donaldson has been appointed manager of the Beaver and Kirkland Lake Mines.

Frank Groch, of the Groch Centrifugal Flotation, Limited, has returned from a business trip to southern points.

Martin Childerhose, of Toronto, recently visited Kirkland Lake district in connection with mining interests there.

Harry Donaldson has been appointed superintendent of the Beaver Consolidated Mines, succeeding L. W. Ledyard, who resigned recently, prior to leaving for the south-western states. Mr. Donaldson was in charge of work at the Beaver Auxiliary property at Elk Lake some years ago, and has since been engaged in mining near Madoc. As to whether or not he will also take charge of the Kirkland Lake Gold Mines for the Beaver Company has not been learned.

Hon. G. Howard Ferguson, Minister of Lands, Forests and Mines, paid a flying business to this district early this week.

Frank L. Culver, president of the Beaver Consolidated came north Thursday morning.

D. McPhail, who has managed the operation of the Hudson Bay Mines, Cobalt, for the past few months, has been appointed manager of the Dome Lake mine at Porcupine. It was reported a few days ago that Mr. Hutchinson, of New Liskeard, had taken over the management. This report was erroneous. Mr. Hutchinson is secretary-treasurer of the Hudson Bay and the Dome Lake Mines.

:-: EDITORIAL :-:

CANADIAN MINING INSTITUTE'S PROSPECTING PLAN NOT FAVOURED BY THE GOVERNMENT.

The August "Bulletin" of the Canadian Mining Institute, states:

"It is with very real regret that we are obliged to announce the failure of the Institute's efforts to induce the Dominion Government to adopt the plan, as submitted by Mr. Dresser, for the employment of returned soldiers in national prospecting. As was noted last month, after receiving an intimation from the Minister of Mines of his inability to awaken the interest of his colleagues in the merits of the proposal, which, therefore, was rejected in Council, it was decided to bring the matter directly to the attention of the Prime Minister. This was done by a deputation; but before the termination of the interview the Institute's representatives had arrived at the conclusion that they might expect to receive a negative reply. Unfortunately this premonition proved to be only too well-founded, for a few days later the Secretary was officially notified that the decision of the Cabinet to reject the scheme would not be reconsidered. This was further confirmed by a statement by the Minister of the Interior in the House of Commons, in reply to a question addressed to him by the Hon. R. Lemieux. The nature of this reply clearly indicates that the Government signally failed to appreciate the main aim of the proposal or the direct and indirect benefits that would indubitably result from its adoption. The main aim, of course, was to stimulate and popularise prospecting for minerals in Canada, by Government recognition and encouragement, of the prospector's avocation. The need for prospecting is great, and doubly so now when it is so vitally necessary that the natural resources of the country should be developed and utilised to the fullest possible extent in order that the country's appalling load of debt consequent on the war may be lightened. But curiously enough Canadian statesmen, even men so enlightened as Mr. Meighen, are seemingly unable to grasp the fact that mining is as much a basic industry and as much entitled to encouragement as agriculture, which latter the Government is ever ready, quite properly, to aid. To mining recognition is persistently refused. This industry indeed which even to-day in productive importance holds in Canada the second place, but which eventually may occupy the premier position, so vastly greater are our minerals in relation to our agricultural potentialities, is denied its own representative in the Cabinet, but must be content to be represented by a minister—frequently one of minor rank—holding a dual and unrelated office. Is it to be wondered at then that failing a forceful advocate in the councils of the Government all suggestions to Government to aid mining, however disinterested and well-considered, should fall to the ground."

Unfortunately, Cabinet portfolios continue to be regarded as political rewards, and not as administrative offices. The idea of appointing a mining engineer as Minister of Mines is too elementary, too sane, too efficient to commend itself to politicians. For such administrative functions as Minister of Railways, of Finance and Agriculture, straight-thinking, not to say ingenuous members of the technical professions, might consider a railway manager, a bank official, and a farmer, but seemingly there must be other and weightier considerations than ability and fitness in filling cabinet offices. The appointment of Dr. Tolmie, a farmer, to the post of Minister of Agriculture, is an exhilarating exception, and gives point to the criticism of the Bulletin that the government cannot grasp the basic importance of mining as they do the importunities of the farmer.

What is the reason? Is it because the farmer is more vocal, or because there are more of him?

The proposal made by the C. M. I. in regard to prospecting had in view not only the employment of returned men, but also the opening up of the unprospected areas of Canada, and the proposal originated out of a desire to assist rather than encumber the government. The Institute was genuinely desirous to assist in the problems of reconstruction, but its proposals received scant consideration.. Indeed, although the scheme formulated had received the earnest and protracted consideration of some of the ablest geologists and some of the most experienced heads of mining enterprises in Canada, the Minister of Mines felt justified in surmising that "the advantages which might be secured from a mining point of view are regarded as more or less doubtful."

Which is equivalent to stating that the Canadian Mining Institute had submitted an ill-considered and impolitic proposal, chiefly impolitic we surmise.

EDUCATION AND CITIZENSHIP.

In Winnipeg, October 20-22, it is proposed to hold a National Conference on "Moral Education in the Schools in Relation to Canadian Citizenship." Elsewhere in this issue will be found the announcement of the Convening Committee, and for further details would refer our readers to the General Secretary, Professor W. F. Osborne, of the University of Manitoba. It may be thought that it is a singular departure from established procedure to ask the readers of a mining periodical to consider the ethics of pedagogy, but the times are singular, and we have good precedent in the action of the associated technical societies of Canada that have joined in the approval of a Memorial on education, that is likewise to be found in this issue.

The Committee that prepared this Memorial may be regarded as expressing the opinion of the engineers and technicians of Canada, and, if for no other reason, this unprecedented expression of opinion from a usually inarticulate group of persons, gives it a first-class importance. Two of the recommendations of the Committee touch the roots of our educational problem, namely, the necessity to provide a sufficient number of sufficiently educated teachers before any large expansion of the scope of education can take place in Canada, and, secondly, the necessity to lengthen the period of compulsory education of children. It is also suggested that some form of continuation education should be made compulsory for two or more years after the close of the school-age proper.

The world is very crazy today. There is a great deal of running to and fro in the earth, and a perfect avalanche of free advice, much of it worthless, and people are getting tired of talk of "uplift" and prohibition, and millenial schemes that ignore the little peculiarities of human nature and the general applicability of the Decalogue to modern times. It is therefore, refreshing to find, that nothing revolutionary or impossible is advocated by the Memorial referred to, but that everything it recommends is a natural outgrowth from our existing educational systems. It merely asks that growth should be assisted and that good should be made, if possible, better. Therefore we bespeak for the Memorial the earnest consideration of the Federal Government, and of the provincial governments also, particularly when considering the disposition of the appropriation which Parliament has approved for federal assistance to technical education.

BAD HOUSING AND ANARCHY.

Our King is a sensible man. His occasional expressions of opinion, not too freely proffered, are so sane and true, that like the Decalogue, they are out-of-date, and not fashionable, and not nearly so popular as the opinions of the Fabian Society.

Recently, King George said that better housing and an enlarged, and freer scheme of education were two things he desired to see and would personally strive for. His utterance does credit not only to his heart, but also to his statesmanship.

Has anyone noticed the sinister connection between bad housing and industrial strife in its worst and ugliest shape?

Dublin and Glasgow possess some of the most hopeless and evil slums on earth, and everyone knows what has happened there. At the moment of writing, the slum-dwellers of Liverpool, who live, as a newspaper despatch says with unconscious irony, in "a well-defined area" are rioting and pillaging during a strike of the police.

London has not been conspicuous as a centre of rebellion in recent years, but entirely otherwise, and who knows what trouble has been avoided by the abolition of the evil rookeries that disgraced the Capital in former years.

A great deal of the trouble in the British coal industry originated in the housing conditions in the Lowland coal districts, and in contemplation of the hideous results of the one-room house which is not uncommon in Scotland, the public and the Coal Commission overlooked the great advances which miners' housing has made in recent years in South Yorkshire and elsewhere in Britain.

In Canada we have some plague-spots, some true nurseries of revolt proceeding from hopelessness. The water-front of Halifax, the so-called "Cokovia" of Sydney, and certain "well-defined areas" of Montreal and Toronto, menace the existence of the decent amenities of more favoured localities.

It is usually, and unthinkingly assumed that the present day danger of revolt and resulting anarchy, that spewing-up of the subterranean volcanoe which Carlyle reverts to again and again in his "French Revolution" as a symbol, comes from the poor and so-called labouring classes. But does it?

Many of the poorest workingmen are carrying on a daily struggle against their surroundings, trying to cling to the decencies of life and the consolations of old-fashioned religion and morals. These people are not dangerous to the social fabric—indeed they are its salt and savour—unless by the selfishness and apathy of those who vote and thereby govern this country, their surroundings are allowed to remain abodes of hopelessness and caves for the Adullamites of today.

The poor are not the anarchs of modern society. It is the profiteer, the slum landlord, and the wealthy alien who exploits his ignorant countrymen in our midst, that have thrown off the bonds of restraint. Some person has recently spoken of England as "a country where the population consists of the nice people whom the war had impoverished and the nasty people it has enriched," and Canada may be divided along similar lines.

There are happily signs amongst us that the menace of slums is realised. In the Memorial on Education—elsewhere referred to in this issue—it is advocated that instruction in community and national life, lessons in citizenship, and the value of the vote, should be included in the curriculum of the elementary schools. This seems a sensible proposal. Why should not the possibilities of town-planning, and the dangers of the slum be taught to children before their minds have lost their receptiveness, and before the alluring money-making possibilities of rack-renting slumdom has dulled the conscience of the prospective voter?

We have especial responsibilities in Canada because our population is cosmopolitan, and we have already had sufficient evidence of the atavistic lapses of aliens in our midst to warn us against permitting the growth of the slum in our still infant cities. Lines

by a former Editor of the "Atlantic Monthly" seem equally applicable to Canada as to the United States:

"Wide open and unguarded stand our gates,
And through them presses a wild, motley throng—
Men from the Volga and the Tartar steppes,
Featureless figures of the Hoang-Ho,
Malayan, Scythian, Teuton, Kelt and Slav,
Flying the Old World's poverty and scorn;
These bringing with them unknown gods and rites—
Those, tiger passions, here to stretch their claws.
In street and alley what strange tongues are loud,
Accents of menace alien to our air.
Voices that once the Tower of Babel knew!
"O Liberty, white Goddess, is it well
To leave the gates unguarded? On thy breast
Fold Sorrow's children, soothe the hurts of fate.
Lift the downtrodden, but with hand of steel
Stay those who to thy sacred portals come
To waste the gifts of freedom. Have a care
Lest from thy brow the clustered stars be torn
And trampled in the dust. For so of old
The thronging Goth and Vandal trampled Rome,
And where the temples of the Caesars stood
The lean wolf unmolested made her lair."

SERIOUS CONTRACTION OF PRAIRIE PROVINCES' COAL SUPPLY CAUSED BY STRIKES.

The Minister of Agriculture for Saskatchewan recently wired the Minister of Labour at Ottawa as follows:—

"Protracted strike Alberta coal mines causing serious fuel situation in Saskatchewan, practically all local stocks, domestic and steam coal exhausted. Winter's supply aggregating a million and a quarter tons yet to be mined and shipped, other years considerable tonnage received during July, none this year. Many hundreds steam threshing outfits may be unable to operate unless steam coal is available quickly. Would impress seriousness of situation and urge necessity of promptly resuming coal mining operations in Alberta."

It is said that practically no coal was sent from the Alberta mines to Saskatchewan during July, although in July, 1918, the largest shipments of Alberta coal during the whole year were made. It is a great pity after having so conclusively demontrated that Alberta coal could supply the home requirements of the Middle West, as was done last year, that the protracted and useless strikes at the Alberta collieries should have undone all the work that the Fuel Controller effectively commenced in 1918. Last year the Alberta miners asked the Canadian Government to put an embargo on American coal so as to help the production of the Alberta mines, and this year, in defiance of their own labour union, the Alberta miners have causelessly thrown the collieries idle during just that portion of the summer when coal production is most effectively carried on, and when transportation for the coal is available, as it will not be available when the grain commences to move, and when winter sets in. Indeed, it is said that the coal shortage occasioned by the strike is hindering the threshing of the grain, so that the evil is a double one.

POOR ROADS DELAY DEVELOPMENT OF BOSTON CREEK AREA.

At the Miller-Independence mine, three miles from Boston Creek, there is known to be a promising gold deposit, which is quite different in character from those of the producing gold mines of Northern Ontario.

It is highly important that this deposit should be promptly developed. There may be many more deposits of similar nature yet undiscovered, and all that can be learned about this one should be made available as soon as possible. We regret that the operators are not being given proper assistance by the Government of a Province which profits so largely from the development of its mineral resources. A good road to the property should be built.

It has been generally admitted that the production of gold is highly desirable. It is not always easy to indicate the best means of encouraging production, but one fact is well established, and that is that the Government should do its best to furnish roads for promising districts. Up to date next to nothing has been done for the operators in the Boston Creek area, so far as roads are concerned. We hope that the development of the Miller-Independence gold deposit will not long continue to be hampered by transportation difficulties. It is by no means the only promising property in the area; but it is of itself of sufficient importance to warrant the Government building a wagon road which would not only serve this property, but the many others in the neighborhood.

Gold mine operators are spending large sums of money in developing properties. They should not be expected to construct provincial highways with the funds that are provided for exploration of ore deposits. The Ontario Government can show its intention to assist in the development of mineral resources by giving prompt attention to the needs of the Boston Creek area.

EDITORIAL CHANGES.

Mr. Reginald E. Hore, mining geologist, who has since June, 1913, been the Editor-in-Chief of the Canadian Mining Journal, is retiring from active direction of the journal to take up professional consulting practice. Mr. Hore is particularly interested in metalliferous ore deposits and his work will be to assist operators in determining the nature of ore deposits as development progresses. Mr. Hore is an expert petrographer, as well as a geologist, and when he joined the staff of the Journal he was instructor in petrography and geology at the Michigan College of Mines, as well as geologist in charge of work for the Michigan Geological Survey in the copper mining district of Michigan. Previously Mr. Hore had been instructor in pet-

rography at the University of Michigan, Ann Arbor; at Queen's University, Kingston, and at the University of Toronto, Toronto. He spent two summers in Northern Ontario prospecting and examining prospects. In 1906 he was one of Dr. W. G. Miller's assistants in mapping the Cobalt silver area. Since that time he has studied a very large number of silver and gold deposits in Northern Ontario. In Michigan Mr. Hore spent some time in the iron districts, though his special work was in the copper mines. In all the mining districts in which Mr. Hore has worked, the ore deposits are in Pre-Cambrian rocks, and it is therefore in Pre-Cambrian areas that he is particularly able to give assistance to mine operators.

Mr. Hore's long experience in editing the Journal, and his special knowledge of Canadian mines, will be retained for the benefit of our readers, as he will continue to be associated with the paper as Consulting Editor, and will from time to time contribute articles connected with the subjects in which he is particularly interested. As compiler of the "Canadian Mining Manual" Mr. Hore possesses a uniquely extended and intimate knowledge of the minerals and the operating mines of Canada.

Mr. F. W. Gray, who during the past two months has been Associate Editor of the Journal at the office of publication at Ste. Anne de Bellevue, will take the editorship. Mr. Gray has been a regular correspondent and contributor to the Journal since it absorbed the "Canadian Mining Review" in 1907.

MEMORIAL ON EDUCATION PREPARED BY A COMMITTEE OF THE ASSOCIATED TECHNICAL SOCIETIES OF CANADA.

Sir,—A committee representing the Canadian Mining Institute, the Engineering Institute of Canada, the Canadian Textile Institute, the Canadian Manufacturers' Association, and other industrial, educational and technical bodies as enumerated below has had under consideration for a year the pressing necessity for improvements in the education of Canadian children and youth in the direction of better training for citizenship and the general upbuilding of character. It is doubtless known to you that this subject is under earnest discussion throughout Canada by various organizations; all of which have so strongly felt the need for some change in our methods of education, that they have passed resolutions asking for various things including more technical education, more attention to the practical needs of our people, a better training for citizenship, etc. The Committee mentioned above has held a number of meetings and discussed the subject thoroughly. The conclusions reached may be summarized as follows:

1. It is of vital importance for the development of a Canadian nationality with high ideals, and efficient performance, that there should be an early and thorough training for citieznship in all schools throughout the Dominion. To be effective this training must be based upon the ordinary activities and occupations of the children and young people. The success of this method is well shown by the Boy Scout movement. Any attempt to teach the abstract principles of citizenship and moral conduct solely through text-books, notes, or lectures is sure to be futile. Children do not understand the abstract, but must be appealed to by the concrete. Fair play, honest dealing, courage, responsibility, co-operation, service, thoroughness and thrift can be inculcated in connection with games, gardening, carpentering, sewing, and other practical occupations, and also in the course of reading, and other lessons dealing with subjects in which children are interested.

2. The committee are of the opinion that compulsory education should be universal throughout Canada up to the age of 14 years at least. They beg to point out that illiteracy even in a minor degree is a great handicap, reducing the productive efficiency of the population, and tending towards the kind of degeneracy of which there are now painful examples in a number of the provinces. Illiteracy is a danger in another respect. It prevents that education of the people, which would be invaluable in any great crisis such as that at present exemplified in Russia. The masses in Russia cannot be reached because they cannot read. It is thus impossible to influence them as an educated populace can be influenced. They are an easy prey to demagogues. The question should also be considered whether some form of continuation education should not be compulsory for a further period of two or more years.

3. The best system is bound to fail in the hands of teachers who themselves may be undeveloped, and insufficiently educated in the direction required. To secure the desired results it will be necessary to pay the teachers larger salaries in order to make it worth while for the best men and women to devote themselves to the profession. It will also be necessary to give these teachers a better kind of training than they at present receive. This implies an overhauling of the various types of schools for training teachers and incidentally paying better salaries there.

4. Improvements in text-books would be advisable to make them interesting and more closely related to the natural knowledge and the ordinary activities and occupation of children and parents. This would open up the opportunities for character building and for the training in citizenship referred to in section 1. There should also be prepared text-books of special character such as those lately published by the United States Dept. of the Interior, Bureau of Education, and entitled, "Lessons in Community and National Life," The committee feels that in the reading and other books used in the schools great cars should be taken that the selection of readings and examples be within the apprehension of the pupils and that they include subjects of every day life.

5. The nature of the instruction should be such as to interest the children more deeply in the things around them and to give them clear ideas of Canadian citizenship and its responsibilities. The character of the illustrations used in teaching should be varied according to the activities of the community. In other words, the school room should be adapted to the interests of the community. The text-books should be supplemented by exhibits of manufactured articles, farm products, etc., and by excursions and lessons outside of the classroom. Schools should be provided in all cases with libraries, selected in part to fit the occupations of the people of the district.

6. The rural schools present special problems. Owing to scattered settlements in many parts of Canada it is very difficult to organize good schools. In the case of settled country a solution may be found in consolidation of small inefficient schools on well known

plans, but in the systematic and scientific planning of new settlements the school needs of the community should be carefully provided for. The committee has also reached the conclusion that larger school units are advisable and where possible the municipality should be the unit for school purposes.

All of which is respectfully submitted with the urgent request that this matter be given serious attention and remedial action undertaken.

Chairman . . . . . .

Secretary . . . . . .

Names of Representatives of Organizations and Industries.

NATIONAL CONFERENCE ON MORAL EDUCATION IN THE SCHOOLS IN RELATION TO CANADIAN CITIZENSHIP.

In common with the rest of the civilized world, Canadian communities have been profoundly impressed, through the revelations of the great war, with the necessity of emphasizing in the strongest possible way the educational activities that make for the formation of character and that tend to promote a high standard of individual and national life. While it is recognised that the ethical aim has always been present in the schools, it is well known that the diverse racial and religious elements of which our people are composed have hitherto made any attempt at organized moral education difficult. Misunderstandings, mutual distrust, inability to agree on content or method have prevented the co-operation necessary to effective action. It is believed, however, that many prejudices that formerly obscured essentials have disappeared as a consequence of the war and that the time is opportune for emphasizing the importance of character training as a preparation for citizenship. At the outset of the great struggle from which we have just emerged, the world was confronted with a people of some sixty millions thinking and feeling as one man in a conspiracy to subject the world to the domination of the German race. This unity of thought and purpose was the outcome of carefully planned and energetically conducted educational propaganda beginning in the elementary schools and carried on by university, church and press. If the energy of an entire people could be enlisted and directed by means of its educational agencies towards an evil purpose, it is believed that the same factors would be even more effective if set in motion for a righteous end. In this belief a number of gentlemen active in the professional, business and educational life in Winnipeg, resolved to come together to discuss the matter, and determine what action, if any, should be taken. On the invitation of His Honor Sir James Aikens, a meeting for this purpose was held at Government House and the progress of the discussion showed that all present were deeply interested, profoundly impressed with the need, and fully persuaded of the possibility of making a forward movement in education. It was recognized that any movement of the kind to be effective should be national in its scope and should command the interest and and sympathy of all the people in every part of the Dominion without distinction of race or creed. To ascertan the extent of which such interest existed or could be aroused, a central committee was organized. Five gentlemen undertook to contribute one thousand dollars each for preliminary expenses and steps were then taken to present the matter to groups in the larger cities throughout Canada. Some forty cities and towns were covered, and local committees formed. Without going into detail, it may be sufficient to say that great interest was manifested at every point and that the various discussions led to the determination to call a national conference to discuss the question of moral education and training for citizenship. The purpose of the conference is to stimulate public interest so as to accentuate character training in the schools and other institutions. It is further hoped that one of the outcomes may be the establishment of a foundation for the study of the whole problem, the result of this study to be made available for educational workers everywhere.

The Rotary clubs undertook the finance and the necessary funds are in sight for the holding of the conference. The sum of $70,000 has been pledged for the purpose. It is planned to hold the conference at Winnipeg on October 20th, 21st and 22nd, 1919.

The Finance Committe consists of Rev. E. Leslie Pidgeon, Past International President of the Rotary Club; Sir James Aikins, W. J. Bulman, President Canadian Manufacturers' Association; H. W. Wood, Calgary, President Canadian Council of Agriculture; and N. P. Lambert, Secretary of the same organization. The Chairman of the Programme Committee is Chief Justice Mathers. Sir James Aikins, Lieutenant-Governor of Manitoba, is Chairman of the Convening Committee at Winnipeg, and His Excellency, the Duke of Devonshire, the Governor-General of Canada, has graciously accorded his patronage to the Conference and has consented to be present.

The trouble with the engineer is that, in general, he has received a great deal of instruction and not enough education. Mr. William Maurice lays stress on this point in a well-reasoned paper on "The Education of Colliery Managers for Administrative and Social Responsibilities." which he read recently before the Institution of Mining Engineers. In his opinion, "the daily round and common task of the colliery manager is not so much to direct the inanimate forces of Nature as to guide and control those infinitely more complex living forces which find their expression in the mind and spirit of man." This appears to be a fair statement of the case, and it would apply with equal force to all engineers holding responsible positions. Yet there are engineers who would persuade us that the time and money spent by an engineering student in acquiring a general education are wasted, as witness the following quotation from a paper on Engineering Education which appears in the July number of a well known publication: "Education . . . seems to be something which might well be an afterthought, a post-graduate course, and something that should not be paid for by the rank and file whose aspirations stop with doing engineering." If such a doctrine were approved and adopted by the engineer, his case would be hopeless indeed. It can hardly be doubted that if our engineers had a broader training in the humanities and in the principles of citizenship and were imbued with the essential elements of "sociology," they would approach their life's work with an entirely new outlook, and one of the causes which lie at the roots of so many industrial disputes would be removed.—C. M. I. Bulletin.

The Huntingdon Copper Mine, Quebec

By REGINALD E. HORE.

In company with Mr. Fred M. Connell, president of the Eastern Mining and Milling Co., Ltd., I have recently visited the Huntingdon copper mine near Eastman, Quebec. From my observations and from information supplied me by Mr. Connell, I believe it probable that the operation of this mine as planned by the present owners will prove a profitable venture. The recent strengthening of the market for copper should encourage the operators to proceed with their plans without delay. Readers of the Journal may be interested in some account of the property, the recent operations and the plans for the future.

When Mr. Connell and his associates took over the property there was on the dumps about 50,000 tons of ore averaging about two per cent copper. This material had been discarded by the former operators whose methods of treatment were suitable only for high grade ore.

Ore Dumps, Huntingdon Mines

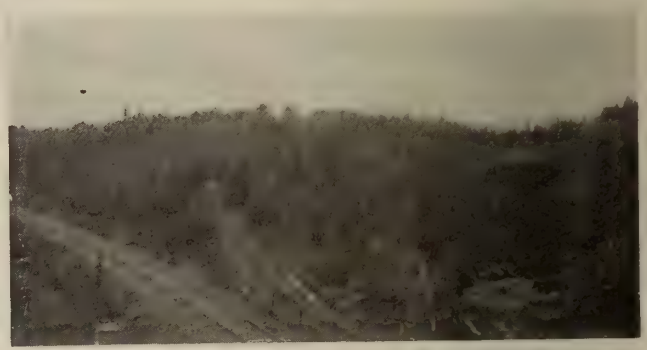
The new owners had experiments conducted at the General Engineering Company's testing laboratory at Ottawa and it was found possible to treat the ore successfully by the oil flotation process. A 100-ton oil flotation plant was then installed in the building already on the property. A tramway was constructed from the dump to the top of the mill. An electric transmission line was constructed from the mine to Eastman, connecting with the main transmission line of the Southern Canada Power Company. A contract was entered into with the company for the necessary power at $37 per horse power per year. A railway siding was constructed. Exploration was conducted on the surface and a tunnel was driven to cross cut the ore-body. The concentrator was completed in October, 1918, and up to the first week in February, 1919, about 6,000 tons of the ore on the dump had been treated. Twenty-six car loads of concentrate were shipped to the Nichols Copper Co., Laurel Hill, Long Island, New York. Very satisfactory results were being obtained when the great break in the price of copper made production inadvisable. During the first half of 1919 the plant was idle, but operation has been recently resumed.

The price of copper is fast rising toward that which prevailed in 1918. Copper producers, having taken their losses, seem likely to find a good demand for the product from now on, and the Huntingdon resumes production at what seems to be just the right time.

During the operations all parts of the dumps were carefully sampled and ore drawn from many places for the mill. It was found that nearly all the material on the dumps is ore that can be profitably treated by the oil flotation process. Evidently the former owners shipped only high grade ore.

The Property.

The accompanying photographs show the mine to be very conveniently located on a railway. The railway is a branch line of the C.P.R., and was formerly known as the Orford Mountain railway. It crosses the Sherbrooke branch of the C.P.R. at Eastman; but, owing to a difference in grade at Eastman, connection is made a mile west of the town at Eastray. The Orford Mountain line gives connection with North Troy at the south. Windsor Mills is the north-eastern terminus of the branch. Eastman is about 80 miles east of Montreal. The Huntingdon mill is about 3 miles south of Eastman.



Looking North from Dumps at Huntingdon Mine.

At the mine the railway traverses ground that is probably underlain by serpentine. On the west is low ground, the valley of the Missisquoi river. On the east the ground rises sharply. Close to the railway is ore deposit. On either side of the railway are dumps of ore discarded by the former operators. From near the railway a tram line runs up to the mill, the top of which is visible from the track.

On the property, which consists of 409 acres, there are several good buildings. The mill building is large enough to house the proposed 250 ton plant. Other building provide sleeping quarters and cook-camp for the men, office and residence for the manager, store house, power house, blacksmith shop and stables.

While the immediate vicinity of the mine is rugged country, there is close at hand a well developed farm-

ing area. There are in addition to the exceptional railway facilities some very fair country roads, one of which runs directly from the property to Eastman. The cost of transporting supplies to the mines will obviously be, as compared with many mines, relatively low. The close proximity of the village will also permit of mine workers residing there if they wish to do so. Those who have undertaken to develop mines in out of the way places will appreciate the advantages enjoyed by the operators of the Huntingdon mine. There are also the favourable conditions common to many of our Northern camps as regards fuel and water. There are many trees on the property suitable for mine timber, as well as a plentiful supply of wood suitable for fuel. The Missisquoi river runs across the property a short distance west of the mine, affording a plentiful supply of water. Electric power sufficient for the proposed plant is already provided for.

The Ore Deposit.

The Huntingdon ore deposit is a well mineralized mass of greenstone which strikes in a northerly direction across the property. On the west of the ore deposit there is grey and green massive serpentine. On the east there is a grey schistose rock. A few feet east of the main ore-body there is a thiner ore deposit in the grey schists.

In the main ore-body, chalcopyrite is liberally sprinkled through the dark green chloritic rock. It occurs in small particles and in sulphide masses. A considerable quantity of pyrrhotite accompanies the chalcopyrite, especially near the footwall side of the deposit. Quartz occurs in veinlets and irregular masses throughout the ore-body, and there is commonly chalcopyrite in the quartz, the mineral being in small particles enclosed in the quartz. Solid masses of sulphides rich in copper and several inches in width form a part of the larger ore-body. In the former operations attention was evidently directed chiefly to the development of these portions, the remainder being too low grade for the then available methods of treatment.

An adit driven a few feet about the base of the hill shown in the accompanying photograph traverses a few feet of serpentine and then 48 feet of ore which averages 3.7 per cent copper. The face of the adit is in a soft grey schist. From surface observations it is expected that more ore will be encountered when driving is continued, the east lode being separated from the main deposit by several feet of grey schists.

Method of Treating the Ore.

To handle the ore from the dumps, a tramway has been constructed from the dumps to the ore bin at the top of the mill building. The ore is trammed in 1,500 lb. cars to the loading station at the tramway and then hoisted in a 2-ton skip. The filling and emptying of the skip is done automatically.

The ore passes through two jaw crushers and is then ground to about 50 mesh in a 6 ft. Hardinge mill. A Dorr classifier returns the coarser product to the mill. The pulp passes to Callow rougher cells and then to a cleaner cell. The concentrate is then allowed to settle in concrete tanks. It is then dried in the tanks by steam and shipped in bulk in case to Long Island smelter. The concentrate averages 12 per cent copper.

Results Obtained.

From the ore treated, concentrate containing 200,910 lb. of copper has been made and shipped to the smelter. The concentrate shipped weighed 1,753,395 lb. The dry weight was 1,698,006 lb. The average copper content was about 12 per cent.

Recovery from ore taken from the dumps was about 80 per cent. From freshly mined ore a recovery of 90 per cent is expected.

View of Power House and Mill.

A View from the Railway, Huntingdon Mine.

From the results of operation of the plant and from sampling of the ore the operators believe that in treating daily 250 tons of ore averaging 2.42 per cent copper the monthly operating, smelting and other charges would be about as tabulated below when the price of copper is 15 cents per lb. With higher copper prices the smelting charges are higher.

Milling 6,500 tons at 87 cents per ton	$5,655
Mining 6,500 tons at 95 cents per ton	6,175
Freight on 884 tons concentrate at $6 per ton	5,304
Smelting loss on 884 tons concentrate at $3.90 per ton	3,447
Smelting charge on 884 tons concentrate at $3.00 per ton	2,652
Refining charge on 884 tons concentrate at $4.41 per ton	3,898
Cost of selling concentrate at 88 cents per ton	778
Assaying charge on concentrate at 20 cents per ton	177
Miscellaneous charges, 10 cents per ton	88
Total cost per month	$28,175
Selling price of 263,140 lb. copper at 15 cents	42,471

At the time of writing, copper is selling in New York at 23 cents per lb. It seems very likely that there will be a big demand for the metal from now on. The operators had confidence that with a plant of 250 tons capacity they would be able to operate successfully with copper selling at 15 cents per lb. Now that a much higher price is available the success of the enterprise seems assured.

Future Possibilities.

In addition to the knowledge that there is at or near the surface a tonnage of ore available that will permit of steady operation of the proposed plant for many months, there are indications that development will prove the ore deposit to be a very large one. I spent only a few hours at the property, but from what I could see in that time I concluded that the Huntingdon ore deposit is a really big one. A series of flat diamond drill holes would help to determine the length of the deposit and its thickness at intervals. The mine workings are doubtless in the richest part of the deposit. The surface exposures and dumps indicate that the workings are almost entirely in ore of a grade that can be profitably treated by the new plant, even if the higher grade portions have been removed. I have little doubt that there is more ore in the unexplored areas north and south of the known ore. To determine this, exploration is necessary. I do not expect that the deposit will prove to be as wide or as rich in the undeveloped portions, for there are indications that such is not the case; but I do expect that exploration will prove the deposit to be a very large one.

That the Huntingdon ore can be profitably treated at the present prices and by the method now in use seems to have been satisfactorily demonstrated. There is also a chance that the mine may become a very large producer. If the deposit hold its width and values to any great depth, as seems quite probable, it is a big one.

There is a high degree of certainty that the ore in sight can be profitably treated. There is no certainty concerning what cannot be seen and sampled, but there is a very good chance that further exploration will disclose a large tonnage of ore. Mr. Connell, to whom I am indebted for all my information as to the results of sampling and of treating the ore and disposing of the concentrate, is an experienced mining engineer of good standing, and I have confidence that the information which I am here passing on to readers of the Journal is reliable.

U. S. COURTS DECIDE THAT TRADE UNION IS RESPONSIBLE FOR MEMBERS' ACTS.

The most important decision affecting the responsibility of labor unions and the first instance in the United States where a labor union had been held liable for damages for an act of its members is that recently rendered by the United States Circuit Court of Appeals for the Eighth Circuit in imposing against the United Mine Workers of America damages to the amount of $625,000 for violation of the Sherman Anti-Trust Act. Three essential principles are established by the decision.

First.—That a labor union is responsible under the Sherman Anti-Trust Act for treble damages for injury or destruction of property by its members.

Second.—That the organization is responsible as a principal for the acts of its district and local branches or their officers and members.

Third.—That the organization is responsible when it takes no steps to control or discipline its officers and members for acts of violence.

BOOK REVIEW.

Mining Engineers' Handbook, Robert Peele; 4¾ x 7 x 2½ inches. John Wiley & Sons, Inc., New York, Chapman & Hall, Ltd., London, 1918. Price $5.00.

We bring this handbook to the attention of our readers, believing that it is not as yet sufficiently well known in Canada. Under the editorship of Robert Peele, Professor of Mining Engineering in the School of Mines of Columbia University, a staff of specialists has prepared a veritable encyclopedia of that extremely varied and composite of pursuits, namely, mining engineering as practised today.

Not since the time of Georgius Agricola has any single person essayed to write a volume descriptive of the whole art of mining engineering, but Professor Peele, by combining the labours and experience of men who are acknowledged leaders and specialists in their chosen branch of mining engineering, has well night accomplished such a volume.

The volume contains 44 sections, and the best idea that can be given of the scope of the work is to quote a partial list of the sections and their writers, as follows:—

Mineralogy, by Prof. Alfred J. Moses, Columbia.

Geology & Mineral Deposits, by Prof. J. F. Kemp, Columbia.

Earth Excavation, by H. P. Gillette.

Tunnelling, by David W. Brunton & John A. Davis.

Mine Geologic Maps and Models, by Reno H. Sales, Geologist to the Anaconda Copper Mining Co.

Mine Organization & Accounts, by J. R. Finlay, and Cost of Mining, by same author.

Mine Air, Hygiene, Explosions and Accidents, by George S. Rice, United States Bureau of Mines.

Mining Laws, by Horace V. Winchell.

Ore Dressing, by the late R. H. Richards.

Each of the sections is fully detailed in itself, for example, the Section on Mineralogy contains 116 pages, and includes a bibliography of the more important books and papers relating to the particular subject covered.

A set of mathematical tables, and a full index complete the volume.

The book will not only be useful to the mining engineer, but also to the lawyer and other men requiring reliable information regarding mining in all its branches. The arrangement of the book into sections, and the full index make reference easy. "Peele" will doubtless take its place as a standard work of reference along with other well-known engineering handbooks, and we do not see how any student of mining can afford to be without it. The volume contains 2,375 pages, but is surprisingly handy, considering the wealth of its contents. The bibliographies add greatly to the reference value.

A number of changes have recently taken place among the officials of the Dominion Coal Company's collieries at Waterford. Bart. Connors, Manager of No. 14 Colliery for the past ten years, has retired from that position and has been appointed Coal Inspector of the Waterford District. W. D. Haley, formerly Manager of No. 17 Colliery becomes Manager of No. 15, and his place at No. 17 is filled by J. P. McIntyre. Mr. H. A. Macleod is appointed Manager of No. 14 Colliery.

Asbestos Mill of the Asbestos Corporation of Canada, Ltd., Thetford Mines, Quebec

Preliminary Steps in the Development of a Graphite Deposit--II.

By CHAS. SPEARMAN.

Probably no other branch of mining offers a wider field of general investigation than that of graphite and the many failures in this industry may be attributed in the majority of cases to venturing without accurate preliminary knowledge of its various subdivisions such as the nature of the deposit, the mining, the refining, the uses, the marketing, etc.

The value of a graphite deposit depends firstly upon the physical and chemical properties of the contained graphite; secondly, upon the tonnage and tenor of the ore available for milling purposes; and thirdly upon the process of refining and the market.

Graphite differs from most minerals in that an average assay sample from a deposit may on analysis show a high content and yet the deposit may have a relatively low value when measured by the physical properties as standardized by the consumer. The bulk of graphite marketed goes into the manufacture of crucibles and this grade commands the highest price, and the consumer specifies that the stock shall have a moderately thick flake, shall pass through a standard 16 mesh screen, at least 50 per cent shall pass over a standard 50 mesh screen and the whole shall pass over a standard 90 mesh screen and in addition shall contain at least from 85 per cent to 90 per cent or more graphitic carbon and shall be free from such impurities as lime, iron, mica, sulphur, etc. The foregoing specifications eliminate all the finely flaked or so-called "amorphous" graphite from this particular demand and classifies it with the lower grades of graphite with which the market is usually stocked and for which consequently prices are very low. It is, therefore, important that the deposit shall contain distinctly flaky graphite and that the flakes are not too thin and of such dimensions that all or practically all shall be larger than that set forth in the specifications of the consumer of the higher grades. The higher the graphitic carbon content of such a deposit, the more valuable the deposit.

The quality of the graphite of a deposit should be considered from the chemical as well as from the physical standpoint, for if the flake be intimately interlaminated with very thin plates or scales of a micaceous decomposition product or other impurities the grade of the refined graphite may be low if subjected to ordinary ore-dressing just sufficient to liberate the composite flake from the surrounding gangue, and any attempt at further refining may have the desired effect chemically, viz., to raise the graphitic carbon content, but at the expense of lowering the grade physically by creating a thin flake. This thin-flaked refined stock causes a further increase in volume per unit mass of the refined flake and thus renders it less suitable for the purpose of crucible manufacture, and in addition the extra refining usually creates an abnormal quantity of fines or low-grade stock. There are exceptional cases where this enclosed foreign matter has been noted to run as high as 10 per cent. It would be almost impossible to successfully treat ore from such a deposit in order to produce gold crucible stock as it would mean the elimination of all the remaining impurities. As a rule Canadian graphite flake is remarkably free from such interstratified impurities. The writer has had several analysis of flake from well known Canadian deposits and has not as yet found flake wherein the involved impurities exceeded 1.10 per cent, although a great many flakes contain coarse interlaminated marginal impurities such as pyrite, quartz, calcite, etc. Those impurities penetrate laterally into the jagged margin of the flake but a relatively short distance, and are practically all removed by proper ore-dressing methods without serious injury to the flake. (See fig. 1.)

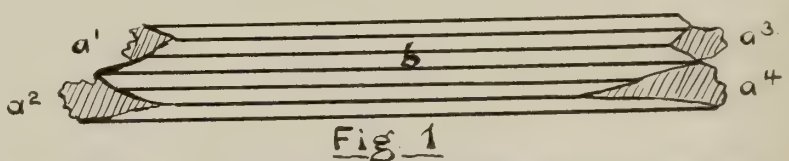


FIG. 1.—a^1, a^2, a^3, a^4 Represents Marginal Impurities Penetrating the Flake b.

A study of the nature of the occurrence of the graphite of a deposit is also an important factor in the determination of the value of a deposit. As a rule the best flake occurs in the softer gangues such as crystalline limestone, schists, etc., or in fissure veins containing little else than graphite and formed apparently under pneumatolitic conditions such as the Ceylon deposits. Much of the flake in the hard gangues such as quartz, etc., is thin and more apt to disintegrate in the process of refinement, while the flake in the softer gangues may be liberated with the minimum injury to the flake. Some of the best Canadian deposits occur in the above mentioned soft gangues and are designated as "disseminated" flake graphite deposits and usually contain from 5 per cent to 20 per cent graphitic carbon. In excess of 20 per cent the flake appears to become crowded and smaller and loses the characteristic uniformity of size and the ratio of crucible stock to the whole graphitic carbon content falls off very rapidly. A fair average graphitic carbon content for an ideal deposit such as the above would be between 10-12 per cent.

Another feature which contributes to the value of a graphite deposit is the percentage of good crucible stock that may be recovered from the ore. A mill may be designed to affect a complete extraction of the graphite content of the ore yet in the dressing of the ore for such extraction the flake is so impaired that a relatively small proportion of the whole is recovered as the best grade. The measure of efficiency of a graphite mill is therefore not the extraction altogether, but for comparative purposes may be designated as follows:

$$\frac{\text{Weight. of graphite recovered as No. 1 crucible stock from ore treated}}{\text{Total weight of graphitic contained in the ore treated}}$$

calculated as a percentage, and the value of a deposit varies directly as the efficiency of the mill. It is therefore very important before constructing a mill to select the most efficient process for the particular ore by submitting representative samples for mill test to the various types of concentrating machines.

A certain process may recover a fair percentage of stock that will pass over a standard 90 mesh screen anl analyze 90 per cent plus graphitic carbon and apparently resemble good crucible stock, but due to over-refining in order to raise the graphitic carbon content the stock will not classify as good crucible stock on account of failing to meet the mass-volume test.

Most Canadian deposits may be developed quickly and cheaply to a certain point by means of the core drill. This preliminary development work, which is more of the nature of determining the structural geology of the deposit may give valuable information such as revealing large possible tonnages of ore, and thus directing subsequent mining operation, or may reveal conditions which would discourage further expenditure for development. A fair approximate net value of a deposit may be calculated from the above preliminary steps if accurately followed and a fair safety factor carried in each step when applied to the deposit as a whole.

NORTHERN ONTARIO.

The Cobalt Strike Situation.

Outwardly, the visitor to Cobalt would scarcely know that a labor strike is in full swing. The only visible evidence is the large number of men who may be seen idling about the streets in groups. Outside the town, however, the change is more notable. Here almost complete silence reigns.

A rather disquieting situation developed when it became known that the watchmen at a number of the mines had been taken from their posts by members of the Union during the night. In some instances an arrangement has been made that the mining company may hire a watchman, provided also that one Union member shall also remain on picket duty.

Up to the time of writing the public utilities had not been interfered with, although the power plants of the Northern Ontario Light and Power Company have all been closed with the exception of the Matabitchoun plant, where some 10,000 h.p. is generated. The public utilities, including the Nipissing Central Railway depend upon this plant for electric energy.

All the neutral influences are being brought to bear an effort to bring about the resumption of work at the mines.

Porcupine Situation Harmonous.

In the Porcupine district the labor situation appears to be exceedingly favorable, a situation in sharp contrast to Cobalt and Kirkland Lake. Such is the impression gained as a result of a visit to the camp and a careful discussion with mine employees and a number of the managers of the mines. Not since 1915 has there appeared to be such abundant reason for optimism over the general outlook in the great gold camp. Also, never before in the camps history were so many men employed at the mines of Porcupine.

As a result of exercising the utmost mutual consideration, the men and the managerial staffs are found to be working together in a manner that appears likely to last. The spirit of co-operation is abroad and its actual application will be intensified as time goes on. The situation is perhaps without parallel in any of the mining districts of the North and speaks for the sane judgment of all concerned.

Work at the mines is going on space and each day less difficulty is experienced in securing men. The Hollinger Consolidated alone has about two thousand men employed, the largest number in its history. The McIntyre-Porcupine has close to four hundred men on its pay-roll.

Official advice is that co-operative stores whereby it is hoped to reduce the cost of living about eighteen per cent below that obtaining during the past twelve months will be put in operation with the least possible delay. It is proposed to operate the stores independent of the mine, having an experienced and efficient man in charge so as to give the employees the full benefit of every possible saving.

Also, the plan to insure men half-pay during time which they may lose due to illness is to become a reality, it is learned officially. Thus, in Porcupine, the foundations of future harmony are being laid. With such able men as A. F. Brigham, R. J. Ennis and C. D. Kaeding working together toward this end and with the good-will of the great body of men engaged. there appears to be every reason to believe that the Porcupine gold area is already rising above the stormy and tempestuous period of re-construction, in a manner that might well prove to be the criterion of other mining areas in the Dominion.

From other districts where labor strikes are in force there has gone out to Porcupine a few men whose chief efforts are stated to be directed toward disturbing the present harmonious situation. Good judgment on the part of the men, it is confidently expected, will withstand the adverse outside influence, and, instead of disrupting mining operations, the effort of the "drifters" may still further consolidate the Porcupine men into a great and lasting co-operative body.

Progress of the James Bay Railway Survey.

The survey party which was sent north last spring for the purpose of looking into the possibilities of extending the Temiskaming and Northern Ontario Railway from Cochrane to tide water at James Bay is making satisfactory progress and is understood to have covered over one-half the total distance of not far under 180 miles.

From present indications some more or less serious obstacles have been encountered in the form of muskeg and in some places large stretches of territory where layers of moss occur sometimes several feet in thickness, and through which road-building would be quite difficult. For the first seventy miles the country is understood to present no serious obstacles, but beyond that point the muskeg and the moss-covered areas are extensive.

As to just how serious the difficulties may prove to be cannot be intelligently estimated until the completion of the survey, although already enthusiasm has grown less pronounced than was the case earlier in the year.

The James Bay survey expedition has experienced considerable hardship during the early stages, including two drowning fatalities and a number or less

serious injuries to members of the party, who had to be taken back to the railway. However, the work is being continued unremittingly, and by the close of the current year the feasibility of a railway to the sea and a seaport for the province of Ontario will probably be known.

That the building of the road would not be impossible is already known, but it is not yet determined whether or not the estimated cost of construction would prove to be within reason as compared with the expected advantages accruing therefrom.

Operating News.

The dividend of one per cent, declared payable August 12th to shareholders of the Hollinger Consolidated Gold Mines of record July 31st, will call for the distribution of some $246,000, and will be the fourth of like amount to be paid this year, or a total of $984,000. By the end of the current year the company is expected to be in a position to increase the rate of to double the present amount by disbursing one per cent every four weeks instead of every eight weeks as at present.

Since going on a dividend paying basis the dividends paid by the Hollinger total some $9,264,000.

A contract has been let for six thousand feet of diamond drilling on property held in the townships of Tisdale and Whitney by the Northwoods Gold Mining Company. One drill is stated to be already at work.

Interest in control of the Hill Gold Mines, in the Munro township area are stated to be negotiating in an endeavor to secure control of the adjoining Gold Anchor property.

The Mining Corporation of Canada, one of the important silver producing companies of the Cobalt district, is becoming quite active in the silver area in the Port Arthur district. It is stated that a small shipment of ore has been made from the West End mine, which is being worked by the Mining Corporation. It is also stated that the company is looking into the possibilities of such old properties as the Badger, Porcupine, Keystone and the East End.

The Port Arthur district yielded considerable silver during the latter part of the nineteenth century, some of the ore being exceedingly rich. It is believed possible that the more efficient mining methods of the present day may result in once more placing certain of the old properties on a profit producing basis.

Progress at the Clifton-Porcupine mine, in the Porcupine field is understood to be exceeding expectations. A contract for drifting has been given to some of the employees of the company, and the work is being carried forward rapidly and at a cost somewhat less than that incurred heretofore.

More than usual interest attaches to the operation for the reason that a number of neighboring properties would take on added value should the development of the Clifton Porcupine continue so favorable as is now the case. The operation is recognized as one of the most efficient for its size in this country.

THE ASBESTOS INDUSTRY IN QUEBEC, CANADA.

The most productive asbestos region in the world is in the neighborhood of Thetford Mines and Black Lake in the Province of Quebec, Canada. Though the output was somewhat curtailed through lack of export trade during the war, prices have greatly advanced and the industry has prospered. About 14 companies are now in operation in the district, and several of them operate two or more quarries.

The rock is excavated almost exclusively by open-pit quarry methods, the small amount of tunnelling done being chiefly for the purpose of obtaining more direct and convenient transportation lines. The rock is drilled chiefly with air-operated tripod drills, and is shot out in benches about 16 feet deep. The larger masses thrown out by the primary shots are block holed, jackhammers being used for this purpose.

The crude fibre occurs in irregular veins scattered through the rock mass, and constitutes the most valuable product. In all quarries producing crude fibre hand loading of quarry rock is a necessity, as the crude must be sorted out by hand. A few quarries producing little or no crude employ steam-shovel methods of loading.

Most of the rock is removed from quarries by overhead cable-way hoists. A recent development in rock transportation consists in the projection of inclined tunnels through which the rock is hauled on cable cars.

The crude fibre is "rough cobbed" in the quarry to remove most of the adhering rock. It is then taken to cobbing sheds where it is hammered and screened to free it of all rock impurities, and it is then shipped without milling. Rock containing fibre veins less than half an inch in width is milled to separate the fibre. Briefly, the milling process consists in crushing and hammering the rock, separating the fibre by air suction and screening, and grading the product into various classes depending on the fibre length.

There is no prospect of a shortage of fibre for all prospective needs. Present plant capacity is sufficient for normal requirements, and the industry could be readily expanded as there is evidently a very large reserve supply of asbestos-bearing rock. Core drilling has shown good fibre-bearing rock at a depth of at least 700 feet below the surface, and it may continue to a very much greater depth. As an indication of the possibilities of development in the region it may be noted that within the past year a new quarry has been opened in the Coleraine district about 10 miles from Thetford mines. The rock contains an exceptionally large proportion of crude and mill fibre, and the deposit is undoubtedly of large extent. — Oliver Bowles, from June Report on Minerals Investigation, United States Bureau of Mines.

"THE CANADIAN INSTITUTE OF MINING AND METALLURGY."

As a result of the recent balloting the Institute will in future be known as "The Canadian Mining and Metallurgical Institute," or "The Canadian Institute of Mining and Metallurgy," as the Council shall determine. At present a majority of our members are miners. By their vote favoring the change of name, they have paid a graceful compliment to their fellows of the allied profession of metallurgy, and at the same time have fittingly expressed their recognition of the important position now occupied by the metallurgical industries in Canada.—C. M. I. Bulletin.

Old Mines of Western Newfoundland

By E. D. HALIBURTON, Port-au-Port, Nfld.

Newfoundlanders have so often heard Newfoundland spoken of as one of the richest mineral countries in the world, yet undeveloped, that they usually accept the statement as a matter of course; but they are appallingly ignorant, as a whole, of any real knowledge of the mineral possibilities of this island. It is that lack of knowledge which induces our moneyed men to invest rather in the mines of other countries. They welcome the success of any local venture, but they have too little faith in our minerals to back mining enterprises financially and to the want of capital, the undevelopment of the country must be attributed.

In this article I shall deal with mines which have been exploited, rather than worked, on one section of the West Coast alone.

The possibilities of the oil areas on the West Coast have never been really tested. About twenty years ago a company, called "The Western Oil Company," was promoted in New Brunswick to develop these areas and a man named Bell was given a contract to bore, at Shoal Point, in Port au Port Bay, on the north side of the harbor of Picadilly. Oil was struck at eight hundred feet and five or six well were sunk to that depth, the best of them flowing about four barrels a day. But the strike was not rich enough to save the company which, its capital exhausted, abandoned the project, and the pipes are there today, still filled with the oil which is used by all the fishermen around as lubricating oil for their motor boats.

In 1908 an English company sent an oil-expert to to same place, with six Londoners who were supposed to have been accustomed to drilling. These men bored to a depth of three hundred feet beside a well of eight hundred feet and of course got no result. The outfit used an old fashioned drill and appliances more antiquated than those used by Bell years before, and the expert is said to have had no control over his helpers who stopped work when they felt so disposed, to drink tea or to go swimming or read the newspapers as fancy willed, and so accomplished little work. This attempt was begun in the winter and many difficulties had to be overcome as a consequence. Instead of bringing their machinery to the spot by boat, as they might have done a little later in the season, they had it come by train to the nearest station eight and twenty miles away, hauling it ten miles across the bay on the ice.

The company in England, considering that the expenses of operations were too great, sent the outfit somewhere else, so they loaded their machinery aboard a schooner in Piccadilly and sailed away. But the expert went away very unwillingly, he had studied the formation of the country closely, the strike and dip of the shales on the opposite sides of the bay, and he was convinced of the existence of unlimited quantities of oil anywhere in the bay at a depth of two thousand feet, for in his opinion it was ideal country.

About the oldest attempt to work a mine on the West Coast, then, the French having certain rights of curing fish and certain jurisdiction over it, called the French Shore, was a venture of those pioneers among Newfoundland mining men, Messrs. McKay and Bennett, whose names are still connected with many of our mines. At that time McKay was manager of the Anglo-American Telegraph Company, which owned as they do still, large tracts of land in various parts of the island. In 1873, the Anglo-American people sent out Captain Andrew Harvey and his son, to prospect on land owned by them on the Western side of Port au Port Bay. These men prospected all summer without success and in the fall set out on their return journey to St. John's. They crossed a cove near the isthmus when the tide was very low and Capt. Harvey, walking out to the waters edge along the ledges on one side of the cove, noticed some gleaming metal which he took for galena; but on closer examination he found that he was standing on a lode of pure lead. They blasted out a specimen, boxed it and brought it to St. John's. The lump weighed four hundred pounds and proved to be 75 per cent pure lead with enough silver in the residue to pay for working the mine.

The company determined to work their property and men were sent on to build the necessary houses and stores in readiness for the next spring. The following year, a schooner left St. John's bringing men and supplies, and immediately upon her arrival at the mine, which was called Lead Cove, operations were begun, under the management of the Harveys.

Thirty men were employed. They sank a shaft on the beach just above high water mark, and at the foot of the cliff, then tunnelled in the cliff about thirty feet and sunk another shaft, tunnelling north from the bottom. Every earlier indication of an unlimited quantity of the metal was supported by the result of these workings, and the quality uniform, with that of the original lump taken as a specimen. For three years work was continued and hundreds of tons of ore were mined and piled on the beach behind a breakwater, built to prevent the sea washing it away. Before this mine had been three years in operation its existence was discovered by the French, and being so near the sea, was within the limits over which they had rights and one morning a French man-o'-war appeared off the cove and ordered the mine shut down. At that time there was much enmity between the French and English, who were always in dispute on this coast, and the Harveys refused to stop working the mine. A second warship, and a third bringing the Commodore of the French squadron appeared, to no purpose. Not daring to use force the French complained to the English cruiser further down the coast. This cruiser was the only law and order enforcing instrument recognized by the British at that time on the coast, for there were no representatives of the law on land, and English laws applied to the English, and French to the French, so the English cruiser came and put a stop to the mine. The place was deserted and hundreds of tons of ore, the result of three years labor, left to the mercy of wind and tide, which soon scattered it over the bay.

Forty-five years ago, when prospecting up Robinsons River, Harvey found a four foot seam of coal, dipping at an angle of forty-five degrees, and striking diagonally across the river to be lost in the woods on the other side. They paid little attention to it as coal was then of little value. The party camped beside this seam for the night and building a fire, heaped huge piles of coal over it so that it burned all night and

kept away the flies which had previously bothered them. Years later when one of the party tried to locate the same spot it could not be found; a landslide had covered over the outcrop. Many coal seams have been relocated in that vicinity during the past few months. Higher up the river the prospecting party referred to, found many huge boulders of hematite, pointing to the existence of a deposit of iron in the neighborhood, but as iron also held little attraction for them they wasted no time looking for it. Coal and iron, the latter containing a trace of titanium, are now known to exist in large quantities on the Eastern side of St. George's Bay, and the whole of Port au Port Peninsula on the opposite side is composed of limetone, all the essentials, including a harbor in the centre, for creating a great industrial community within a radius of twenty miles. At Indian Head, in the bottom of the bay, a deposit of magnetite containing a large percentage of metallic iron, was discovered a few months ago. Just prior to the outbreak of war, an American lady, calling herself a doctor, became interested in this ore and brought down some men from New York with drilling machinery, ostensibly to learn the size and value of her claim. They did no work, however, and on the outbreak of war the whole outfit vanished and nothing has been heard of them since, the circumstances were so peculiar at the time that the peo ple around universally concluded that she was a spy.

The most interesting mine on the West coast, the scene of many attempts, and as many failures, is the chrome iron mine at Bluff Head, the entrance to Port au Port Bay. About fifty years ago a man named Holden was sent from St. John's to open up this mine in the fall and he had huts, stores, and stables erected and a few miners employed. These few miners were working but a few months when winter and disaster overtook them. The mine was nearly up to the top of the mountain, which formed one side of the gulch terminating at the bottom in Bluff Head Cove. The huts where the men lived, were built on a sort of terrace about half way up this mountain and to get to the mine they had to traverse a path that curved around and upward. The miners were four in number and one morning these men left the huts to shovel a path to the mine. When half way across the snow began to move and unable to save themselves three of them were swept away in a gigantic snow-slide; the fourth happening to be the last man and furthest from the centre of the slide, was carried down the mountain for two or three hundred feet but escaped with his life.

One of the men who was swept away was Holden's brother, and after this accident, the company abandoned the mine. But another company, calling themselves the Halifax Chrome Company, took it over. This company, under the management of a man named Leewald did a good deal of work; as many as sixty men were employed, a crusher was installed, and thousands of tons of ore mined, crushed, and ready for shipping. But when the company had reached what would been the red-letter day of its history, it received a big check. A big cargo tramp which came to take away a load dismayed at the appearance of the coast, refused to anchor there and steamed on into the bay, and smaller craft had to be employed to load her, doubling the expenses. Eventually shipping difficulties caused this company also to give up the idea of working this mine.

The wind sweeps down the mountains and gulches with terrific force, but despite all the disadvantages of locality, possessed by this mine, it is being continually "considered." It must wield some unknown attraction over visiting prospectors. The latest failure was an undertaking of two young Americans, brothers, from Oklahoma. They took an option on the mine, and undertook to ship the ore across the straits to Sydney, where they could get seventy dollars a ton for it; all the ore they could have shipped in one season was mined and ready for shipment. They had the chance of a lifetime to make money, but their attempt went the way of the others, although under good managemnt it could hardly have failed.

The country around Bluff Head is rich in many minerals. The Louis Hills and the Blue Hills are rich in asbestos, and gold has also been found there. Lumps of malleable native copper occur in many places.

OIL NOTES.

Anglo-Persian Oil Company Ask for Extensive Oil Rights in the Peace River District.

Whether the Government of British Columbia should grant a very extensive prospecting license in the Peace River district to the D'Arcy Exploration Company, and accept a royalty of 12½ per cent net on whatever output the company might succeed in obtaining, or whether the Province should hold these rights, prospect the territory at its own expense and keep control of the entire output, was the question upon which the Board of Trade, at its regular quarterly meeting recently was asked to express an opinion. It was decided to refer the matter to the council for consideration.

Charles F. Law explained the objects of the D'Arcy Company, which he said was backed by the British Government. If oil were found they were prepared to pipe it to the Pacific Coast, where it would be available for naval and mercantile vessels. It was the object of the British Government, he said, to develop as extensively as possible the oil resources within the British Empire. He explained that the D'Arcy Company was a subsidiary of the Anglo-Persian Company, which had made such a success of the Persian oil fields after three other big companies had failed in the field. Before commercial oil was brought in, $1,000,000 was spent and then 360 miles of pipe line were constructed over mountain ranges 5,000 to 6,000 feet in elevation.

Mr. Law said the main objects for consideration in the matter were that:

1. It is an Imperial matter.
2. There is no cost to the Province.
3. The royalty of 12½ per cent is the maximum received by the United States Government from Federal oil lands in developed oil fields.
4. The royalty payable to the British Columbia Government will exceed by 300 per cent the royal collectible under the ordinary regulations now in force.
5. The Province has no money to go into the oil business, and should not take any risk in what is known to be a most hazardous undertaking.

Would Spend Millions.

6. The total expenditure which will be made in British Columbia, including the cost of pipe line from Peace River to the Coast, if oil is found in large quantities, will be $25,000,000.
7. There is no reserve on surface rights, except such as may be required for ordinary drilling operations and laying pipe lines.
8. The extension of the Pacific Great Eastern Railway to the Peace River would be assured.

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9. A general development of British Columbia Peace River district would follow and contribute to the financial relief of the province by finding business for the P. G. E.

10. The total acreage sought to be controlled does not exceed one per cent of lands in the Peace River district.

11. The company is willing to be limited to the selection of ten per cent of the lands reserved.

Mr. Law explained that there were 25,000,000 acres of land east of the Rockies, which contained one of the greatest coal areas in the world. Many thousands of dollars had already been spent in exploring and prospecting for oil, but indications were not discovered until the fall of 1916. Development of oil fields in Alberta had not yet proved successful. He reviewed the history of oil developments in Western Canada and spoke of the great financial benefit which would accrue to the Province if the scheme were permitted to go ahead.

George Bell, M.P.P. for Victoria, asked Mr. Law why his company had not taken up prospecting rights under the Government regulations. Mr. Law replied that neither his company or anyone else could do as the Minister of Lands had closed the area in question from prospecting and had secured an appropriation of $50,000 to send Prof. Gwillim to investigate the district, which meant that the Government was merely doing again what had been done forty years ago by Prof. Dawson. This, he said, had been done after his proposition had been put before the Government. He considered the Government would be well advised to accept the safer and more advantageous proposition of his company.

"There is a feeling to-day that these things are given to humanity and not to a favored few. These things are in the mind of the Government, and it would be well to hear both sides of the case before dealing with the matter," remarked Mr. Bell.

"That is what we are here for," said another member of the Board.—Victoria "Times," B.C.

It is stated that Mr. J. J. Oxley, an English mining engineer is in charge of boring operations to test forty square miles of country containing oil-shales at Deer Lake, one of the upper lakes of the Humber River on the West Coast of Newfoundland. Some machinery has already been installed.

PETROLEUM IN ENGLAND.

In the Times Trade Supplement there is an article on the Derbyshire oil field, containing this statement: "So far as present indications go, the oil field in Derbyshire, although of some promise, does not appear likely to be very important compared with most of the world's oil fields."

The Hardstoft well was struck on May 28, since which time the flow of oil has been regular, though further drilling has not resulted in any appreciable increase of the production. The well is about 3,100 feet deep, and a pump is to be installed to bring the oil to the service. A gusher is not anticipated, and in calculating the yield of oil a great deal depends upon the area of the field and certain technical features. It is probable, from present indications, that the yield will be of only moderate proportions, but that the wells will be of comparatively long life. The article concludes:

"There are no indications at present that the Derbyshire wells will modify the British oil business of importing and marketing to any considerable extent. At the same time it must be remembered that it is proverbially unsafe to prophesy about petroleum, and that new facts may come to light at any time."

One fact that does not make for optimism in connection with the Derbyshire oil occurrence is that every geologist of note who has given attention to the matter has concluded that the finding of oil in quantity was improbable.

W. H. HANNAH RETIRES.

G. T. R. Chief Fuel Inspector With System Since 1880.

Mr. Wm. D. Hannah, chief fuel inspector of the Grand Trunk Railway System, with headquarters at Montreal, has retired after nearly forty years of continuous service with the company. Mr. Hannah is well known by a large circle of friends, not only in the city of Montreal, but throughout Eastern Canada and the central middle United States, where his duties have brought him in contact with a great number of people in railroad and coal circles. Mr. Hannah was born at Newton-Stewart, Wigtownshire, Scotland, on September 1st, 1844, and entered the service of the Grand Trunk in Montreal in 1880. Since that time he has been assistant agent and night yardmaster at Toronto, general inspector, station agent and fuel inspector at Montreal.

Before severing his connection with the company his fellow workers in the stores and purchasing departments presented him with a purse of gold.

F. E. LUCAS
Economy Engineer, Dominion Steel Corporation

THE NATURAL GAS AND PETROLEUM ASSOCIATION OF CANADA.

The Natural Gas and Petroleum Association of Canada held its organization meeting at the Tecumseh House, London, Ontario, on June 18, 1919. The meeting was a great success and the new Association got away to a splendid start. Sixty-eight delegates signed the roll.

Many prominent men were present, among whom were: Mr. Thos. W. Gibson, Deputy Minister of Lands, Forests and Mines for Ontario; Mr. B. C. Oliphant, President of the Natural Gas Association of America, and Dr. M. Y. Williams, of the Geological Survey of Canada.

Mr. T. P. Pinckard, President of the Windsor Gas Company, took the chair and Mr. Victor Lauriston of Chatham, Ontario, acted as Secretary. Mr. Pinckard outlined the events leading up to the calling of the meeting. At a conference of gas and oil men, held at Chatham, Ontario, last winter, the formation of a Gas and Oil Association had been discussed and a Committee was appointed to go into the matter. This Committee consisted of Mr. F. W. James, Manager of the Union Natural Gas Company of Canada, Limited; Mr. H. W. Braden, Superintendent of the Dominion Natural Gas Company; Mr. R. L. Pattinson of Chatham, and Mr. F. S. Coate, Manager of the Chatham Gas Company, Limited, and the speaker, Mr. Choate, was Chairman of the Committee. The Committee had drawn up a Constitution and a set of By-laws for the proposed Association.

The Chairman then invited a full discussion as to the desirability of forming the proposed Association. Views and comments were freely expressed by a large number of the delegates. The unanimous opinion was that a Natural Gas and Petroleum Association was greatly needed in Canada, and that such an Association should be formed without delay.

Mr. B. C. Oliphant was then called upon and delivered an instructive paper on "The Organization and Aims of the Natural Gas Association of America." Mr. Thos. W. Gibson, Deputy Minister of Lands, Forests and Mines, for Ontario, also gave an address, in the course of which he heartily commended the idea of forming such an Association.

The motion that the Natural Gas and Petroleum Association of Canada be organized was put and carried unanimously. The Chairman then read the proposed Constitution and By-laws, as prepared by the Committee on Organization, and the adoption of same was carried unanimously.

The following officers and directors were elected:—

President—Chas. E. Steele, President Sterling Gas Co., Port Colbourne, Ontario.

First Vice-President—A. M. McQueen, Vice-President Imperial Oil, Limited, Toronto, Ontario.

Second Vice-President—T. P. Pinchard, President Windsor Gas Co., Ltd., Windsor, Ontario.

Secretary-Treasurer—S. A. Morse, Secretary-Treasurer, The Union Natural Gas Co., of Canada, Ltd., Chatham, Ontario.

Directors.—R. F. Miller, President National Gas Co., Ltd., Selkirk, Ont.; A. W. Parks, Oil Producer, Oil Springs, Ontario; J. B. Williams, Jr., Secretary-Treasurer, Sarnia Gas Co., Ltd., Sarnia, Ontario; D. A. Coste, Manager Provincial Natural Gas Co., Ltd., Niagara Falls, Ontario; P. S. Coate, Manager Chatham Gas Co., Ltd., Chatham, Ontario; H. R. Davis, Vice-Pres., Dominion Natural Gas Co., Ltd., Buffalo, N.Y.

On motion it was unanimously decided that the first annual meeting of the Association to be held at Hamilton, Ontario, on Friday, the 19th day of September, 1919.

Evening Session.

At 6.30 p.m. the newly formed Association held a banquet in the Grill Room of the Tecumseh House, President-elect, Mr. C. E. Steele, presiding.

At the conclusion of the meal the President proposed a toast to the King. The toast "The United States of America" was also honoured. Dr. M. Y. Williams then delivered an address on "The Geology of Ontario as it affects Gas and Oil Production." Mr. H. R. Davis presented a paper dealing with "Some Factors Affecting the Domestic Consumption of Natural Gas." Mr. E. S. Estlin, Natural Gas Commissioner for Ontario, read a paper entitled "The Gas Enterprise of Yesterday, To-day and To-morrow." Mr. Thos. W. Gibson again addressed the Convention and predicted a very useful future for the Association in respect of the public as well as gas and oil interests. He expressed the belief that the Association would co-operate with the Department of Lands, Forests and Mines, to the end that the best interests of both distributors and consumers would be served. The meeting closed with a brief address by the President, who asked for the co-operation of all members with a view to making the new Association the success that its auspicious beginning promised for the future. After the singing of the National Anthem the meeting adjourned. Sixty-one names were entered on the roll of active membership.—C.M.I. Inst. Bulletin for August.

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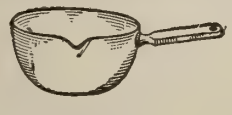

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MONTREAL

AMBER MICA IN CANADA.

Phlogopite, or amber mica, is soft and pliable, and is well adapted for certain electrical purposes, though its dielectric strength is not as great as that of high-grade muscovite. While it is widely known and in fair demand, the only commercial deposits so far discovered are confined to the Provinces of Ontario and Quebec, not far from the city of Ottawa.

One of the important deposits is near Kirk's Ferry on the Gatineau River, about 12 miles north of Ottawa. The deposit was first worked as a phosphate mine, and later for its mica content. It consist of a series of parallel veins in gneiss, the phlogopite being associated with pink calcite, pyroxene, and apatite. The workings are for the most part superficial, and no definite plan of development has yet been worked out. On account of a dull market, production is lagging. Present activities are confined to recovery of mica from the dump piles accumulated in early days when the deposit was worked for phosphate only. There is evidently a large reserve of mica in this locality.

What is probably the largest and best developed mica mine on the American continent is operated by the General Electric Co., near the town of Sydenham, in northwestern Ontario. The deposit consists of irregular pockets and well-defined veins in granite gneiss. The mine was first operated as an open pit worked to a depth of over 150 feet. Later, shafts were sunk and drifts projected at various levels, the lowest being 200 feet below the surface. Two types of mica are obtained, dark amber and pale amber known as "milky," the former being of superior quality.

The mica occurs in remarkably large and rich veins. One vein observed by the writer is 30 feet wide and consists almost entirely of mica in huge crystals, the largest being 4 to 6 feet across and 6 to 8 feet in length. The associated vein minerals are calcite, apatite, and pyroxene. The reserve supply is evidently very great. Present production averages about 7,000 pounds of rough-trimmed mica per week. There is a large proportion of waste which is due chiefly to minute folds and cracks.

Many other deposits of amber mica are worked, for the most part spasmodically as occasioned by the demand, or at slack periods in farming.

It is evident that the Canadian deposits are ample to supply all prospective needs, and that amber mica mining will continue as a distinctive Canadian industry.—Oliver Bowles, from June Report on Minerals Investigation of the United States Bureau of Mines.

OPENING FOR A LEARNED PHILANTHROPIST.

The Civil Service Commission of Canada advertises this month for: "An Investigator, Division of Road Materials, Mines Branch, Department of Mines, at an initial salary of $1,600 per annum. Candidates should be **graduates** in science or engineering of a **recognized university** and have had **special training** in highway engineering and the examination of road materials. They must have a **practical knowledge**, gained by **several** years of experience, in field and laboratory investigation, of problems in the use of naturally occurring road materials in their relation to factors and conditions affecting the highway construction situation in Canada. Reference to any reports the applicants have **written** should be given." The italics are ours. Obviously in the enumeration of the qualifications that the candidate for this post must possess some quite essential ones have not been mentioned. He should also surely be required to have private means, or at least a comfortable bank balance to keep him going during his term of service as a Government official, and naturally he would have to be a true patriot and lover of his country — or else terribly hard-up for a job.—C. M. I. Bulletin.

We think he would require to be all this, and more. —Ed.

CANADIAN MAGNESITE INDUSTRY.

Dead-burned magnesite is produced by the Scottish Canadian Magnesite Co. in the plant of the Canada Cement Co., at Hull, Quebec. This work began in October, 1917, one rotary kiln being used. The initial production was 35 tons of grain magnesite per day. The demand for the product has increased to such an extent that three kilns were in operation during May, 1918, the production amounting to 100 tons per day.

The magnesite as it comes from the mines in Grenville, Quebec, is mixed with 6 per cent of iron ore and the mixture is passed through a jaw crusher and ball mill and ground finely enough to pass through a 100-mesh screen. This mixture is fed to the rotary kilns, such as are ordinarily used in cement burning, and fired at a temperature approximating 2800°F. The fuel used is powdered coal which is blown into the kiln under pressure. The kilns are 60 feet long and it takes one hour for the material to travel through. The burned product is hard, dense, and granular, of a dark-brown color and about the size of fine gravel. This is the grain magnesite sold to the steel manufacturers for lining the bottoms and sides of furnaces.

The following analyses of the raw and calcined Canadian product are of interest especially when compared with the accompanying figures for the Washington material (sample 3.) The high lime content in the Canadian product is especially noteworthy.

Constituent	Sample 1*	Sample 2**		Sample 3***
Silica (SiO_2)	2.60	6.3		6.83
Alumina (Al_2O_3)	1.40	1.9	8.3	6.98
Iron (Fe_2O_3)	.34	6.4		
Lime (CaO)	9.78	16.5		3.20
Magnesia (MgO)	35.80	69.0		82.98
Carbon dioxide (CO_2)	47.10			
Water	.83			
	97.85	100.1		99.99

* Average sample of raw magnesite from Grenville township, Argenteuil County, Quebec. Analyst, R. T. Elworthy, Mines Branch.

** Dead-burned magnesite from Hull, Quebec (6 per cent of iron ore added to raw material before burning. Analyst, S. G. McAnally.

*** Average of over 200 carloads of dead-burned magnesite from Northwest Magnesite Co., Chewelah, Wash.—From June Report on Minerals Investigation of the United States Bureau of Mines.

POSITION WANTED.

Mining Engineer, 15 years experience all kinds metal mines, 12 years Superintendent, Manager and Examination. College graduate. Member C.M.I. Apply A, Canadian Mining Journal.

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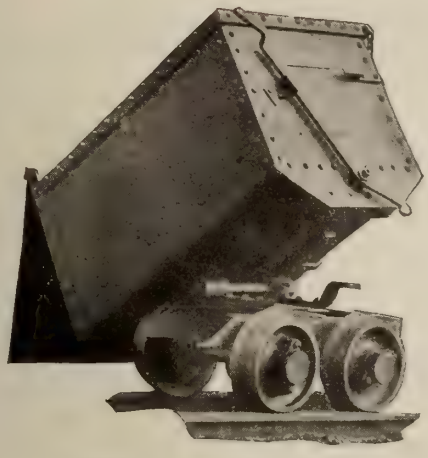
We make the kind of Car you want, and make it just the way you want it made.



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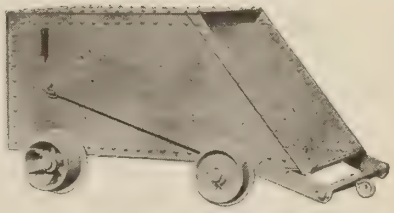

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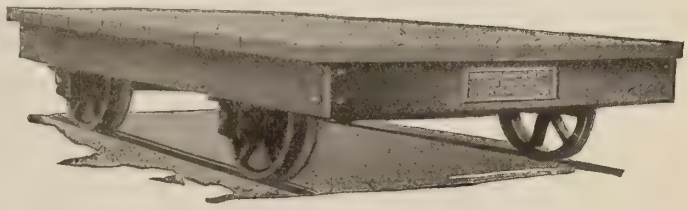
For use on Mine Tipple. Made any size to suit your work, and if desired, with double bottom, and rivets countersunk and flush on the inside, to facilitate easy dumping.



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If you use Wood Cars we can supply you with the wheels, Axles, Boxes, etc., so you may build your own cars. You will save money by so doing.

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2 Norwalk straight line three stage Compressors for charging air locomotives, having compound steam cylinders and two flywheels.

Air pressure 800 lbs. Steam pressure 110 lbs.

Size of steam cylinders—High pressure, 20 ins. diameter. Low pressure, 38 ins. diameter. Stroke, 36 ins. diameter.

Size of air cylinders—23 ins., 16 ins., and 8 ins. in diameter.

ALSO THE FOLLOWING LOCOMOTIVES:—

Maker	Size	Description	Dia., Driver	No. Wheels	Wheel Base	Weight	Length Overall
2 Porter	7″ x 12″	Simple	23″	4	4′0″	14000	13′4″
4 Porter	10½″ x 14″	”	26″	4	5′3″	30000	19′4″
2 Porter	7″ x 14″	”	24″	4	5′3″	20000	18′0″
1 Baldwin	11″ x 14″	”	28″	6	6′6″	40000	22′8″
1 Baldwin	11″ x 14″	”	28″	6	6′5″	34000	19′8″
1 Baldwin	9″ x 14″	”	28″	4	5′6″	25000	17′0″

These locomotives are 3 ft. gauge and have a clearance height from top of rail of 4 ft. to 5 ft. 2 in.

This machinery is all in working order and is open to inspection at Glace Bay.

DOMINION COAL COMPANY Limited, Glace Bay, N.S.

International Mining Machinery Exposition Announced

Announcement is made by the Merchants and Manufacturers' Exchange of New York that one of the big permanent expositions to be a part of its great world trade mart in Grand Central Palace will be the International Exposition of Mining Industries. Since the announcement made some weeks ago that the Merchants and Manufacturers' Exchange was to take over Grand Central Palace for the purpose of turning it into a mammoth trade clearing house, considerable comment has been made in many lines of industry, especially in the mining world.

The new enterprise enjoys phenomenal backing. The Nemours Trading Corporation, of which Alfred I. du Pont is president, owns and controls the Merchants and Manufacturers' Exchange of New York. It has branches in all of the leading cities of the world, consisting of 19 branch offices and 3,000 foreign selling agencies.

The Exposition of mining industries will fill a long-felt want in its own particular field. The development of both foreign and domestic trade to which the venture looks forward unquestionably will be remarkable during the next few years, and in this development the Merchants and Manufacturers' Exchange in general, and the Mining Exposition in particular, will be big factors.

Already the fame of the enterprise is spreading throughout the world and newspapers and trade papers in many foreign countries have commented upon it most favorably. It is practically assured that Grand Central Palace is destined to become a mecca for buyers both domestic and foreign.

Through representatives of the Nemours Trading Corporation inquiries from many parts of the world where machinery and other commodities are desired will be referred to the Merchants and Manufacturers Exchange, and these pertaining to mining will be referred to the Mining Exchange and exhibitors of the specified lines of goods so notified.

The Exposition of Mining Industries will include all that is latest and best in machinery used in the development and exploitation of metal mines, non-metal mines, and oil wells. Likewise machinery used in the subsequent extraction, reduction or refining of the raw products by concentration, leaching, cyanidation, flotation, smelting, distillation, coking, etc.

One great talking point of the Merchants and Manufacturers' Exchange is that buyers going to the Palace who are interested especially in one line of goods in one exchange, will also take advantage of the opportunity to visit the other expositions and exchanges in the building at the same time, with the result that they will find other things of interest in addition to what they came especially to see.

Howard R. Ward will manage the International Exposition of Mining Industries. He is a mining engineer who has practised in the west for the last fifteen years. Prior to entering war work he was for three years consulting mining engineer with the American International Corporation and in addition to his mining work was associated with the organization of its machinery export companies both home and abroad. Inquiries should be addressed to Suite 421, 405 Lexington Avenue, New York.

British Columbia

DOLLY VARDEN LAND GRANTS TO BE REGISTERED.

On the application made by Mr. E. C. Mayers, on behalf of the Taylor Engineering Company, Mr. Justice Murphy has granted an order compelling the registration of certain lands in connection with the Dolly Varden Mines.

In spite of the fact that, by judgment of court and by statute this property has passed into the hands of the Taylor Engineering Company, the registrar refused registration.

It was necessary to exercise care about such a matter, said Mr. A. G. Smith, registrar of land titles. He showed there were technical conflicts about mineral and surface claims and that Crown grants and charges had not been shown according to law.

Registration was ordered to be made by Mr. Justice Murphy, who held that a statutory right was as good as a crown grant.

PERSONALS—Northern Ontario.

R. J. Ennis, general manager of the McIntyre-Porcupine mine, has returned to Porcupine from a brief business trip to southern points.

T. R. Finucane, director of the McKinley-Darragh mine paid a visit to the property.

Robert W. Norrington, together with Mr. Smith, of Detroit, both of whom are interested in the Allied Gold Mines, have returned from a trip to the Matachewan gold area where they made an examination of property held in that district.

The many friends of Mr. Alstair MacGregor, who has travelled in Northern Ontario almost since it opened up in steel and kindred lines, will very much regret to learn that he died at his residence in Toronto after a short illness on Wednesday, July 30th, 1919.

Mr. W. C. Weir, the Secretary of the Temiskaming Mine Managers' Association, died suddenly in a Toronto Hotel on July 29th.

DEEPEST SHAFT IN PORCUPINE.

McIntyre Now Down to a Depth of 1,300 Feet.

McIntyre Porcupine has now the distinction of having the deepest workings in the Porcupine camp. The main shaft has reached a depth of 1,300 feet and is being continued to 1,350 feet where a main tramming level will be established.

Hollinger workings have reached a depth of 1,250 feet, and the deepest work at the Dome is at 1,100 feet. Diamond drill holes have been put down by all three mines to much greater depth, which have proven the existence of similar conditions as met with on upper levels of the mines. That Porcupine is becoming a deep mining camp can be seen by following the developments on its leading properties.—The "Northern Miner."

EDITORIAL

THE COBALT STRIKE—STATEMENT OF THE MINISTER OF LABOUR.

The "Journal" has received the following letter from the Minister of Labour:

Ottawa, Ontario,
Aug. 6th, 1919.

My Dear Sir:—

Some articles appearing in your Journal of July 30th, relating to the Cobalt Miners' strike, your editorial notes and a reproduction of an editorial which appeared in the Montreal "Gazette" have been drawn to my attention.

Do you not think that it would have been but fair to have printed along side the quoted editorial from the Montreal "Gazette" the official statement given out by this Department as to its connection with the Cobalt difficulty and the attempts made to bring about an adjustment of the dispute by conciliatory methods?

The reproduction of the editorial from the Montreal "Gazette" would lead your readers to an entirely incorrect impression as to the attitude of the Department and the Minister, and is quite misleading.

If consistent would be glad to have this erroneous impression corrected in your next issue, by making reference to the official statement given out by the Department which properly sets forth the facts.

Yours very truly,
G. W. ROBERTSON,
Minister of Labour.

Editor, Canadian Mining Journal.

The statement of the Minister—to which we are very glad to give publicity—is as follows:

Interviewed as to cause of Cobalt strike and steps taken to avert it the Minister of Labour stated that, in his opinion, it was due to the expressed determination of the Temiskaming Mine Managers' Association not to deal with or recognize the Miners's Union. The employers base their stand on past unsatisfactory experiences in dealing with the Western Federation of Miners which, in the Minister's opinion, was, at that time, quite justified. During recent years the policy of the Western Federation has materially altered; employers who now recognize and deal with the Federation find the results quite satisfactory. It is, therefore, rather unfortunate that the Temiskaming Mine Managers' Association should judge the Federation now by its policy and leadership of ten years ago, when Mr. Haywood was its leading spirit.

On June 9th last the Miners' representatives brought the existing dispute to the attention of the Department of Labour. An official of the Department visited Cobalt on June 11th, and had conferences with both the Mine Managers' Association and the Miners' Committee, but could not effect an agreement. He, however, obtained an undertaking from the Committee not to call a strike until the Minister returned from the West.

On July 1st the Minister addressed a joint communication to Mr. W. C. Weir, Secretary of the Mine Managers' Association, and Mr. Jos. Gorman, President of the Miners' Union, recommending that inasmuch as both employers and workmen were organized that one or more representative of the men from each of the 16 mines affected and the managers should have a conference, for the purpose of reaching an agreement, if possible. Should they fail it was then proposed that they should agree to refer the matters in dispute to a Board of Conciliation. A representative of the miners came to Ottawa and reported that the men agreed to the suggestions made, but that the employers declined, which statement was confirmed in a letter from the employers to the Minister.

The situation was then explained to the Prime Minister, and a decision reached to invite a delegation of the employers to come to Ottawa for a conference, which invitation was acknowledged and declined in a wire from the President of the Managers' Association on July 15th. The representatives of the men were then informed that there was only one other alternative left within reach of the Government, which would be to appoint a Royal Commission to investigate the trouble. Subsequently, I believe, the employees offered to accept a commission if the employers would agree to accept its decision. Upon the employers declining to agree to this suggestion the strike was called.

The Minister of Labour emphatically denies Press reports that he encouraged the strike, but, on the other hand, did everything consistent and possible to prevent it.

The "Journal" desires to explain that there was no intentional discourtesy or unfairness in omitting to publish along with the "Gazette" editorial the statement of the Minister, which, when our issue of the 30th ult. went to press, had not come to our notice.

With regard to the Minister's proposal that one or more representatives from each of the sixteen mines affected should confer with representatives of the Managers' Association, there is no doubt that this suggestion was an excellent one, and outlined the manner in which the dispute must eventually be adjusted, but unfortunately the union leaders blocked the proposal by stipulating that at this conference the Executive of the Union should be present. As the whole dispute concerns the question of "recognition" and nothing else, it is clear that the interpolation of this stipulation vitiated the essential fairness of the original proposal and distorted its intent.

In the "Correspondence" we publish a letter from "Another Engineer" who well remarks that "the character of the union has not been the character of its members but of its active leaders," and the objection of the Managers' Association to recognizing the Union, based on the record of leadership of the Western Federation of Miners, is admitted by the Minister to have been justified in the past.

"During recent years," states Senator Robertson, "the policy of the Western Federation has materially altered," and here lies the stumbling block to a settlement. The Mine Managers' Association believes it has no guarantee of the probability of satisfactory dealings with the present strike-leaders.

If the point of recognition of the Western Federation of Mines (or its local affiliation) is eliminated, all the essentials for a settlement exist. Good wages, short working-hours, collective bargaining in its widest and best sense, profit-sharing, and representation of workmen by committees, are all conceded and have been practised for a long time at Cobalt.

THE USE OF THE BAROMETER AT MINES.

Our contemporary "Coal Age" publishes a series of letters debating the utility of the barometer as an indicator of the variations in the composition and distribution of mine air occasioned by alterations in the atmospheric pressure.

A correspondent from Ladysmith, B.C., points out out the greater usefulness of the compensated, aneroid recording-barometer, and the small value of the mercurial barometer in giving warning of important changes of atmospheric pressure.

There can be little doubt that the changes in pressure shown by the mercurial barometer follow the effects of such changes of pressure on the mine gases at such a long interval as to make the mercurial instrument quite useless for purposes of warning.

It is doubtful also whether the recording-aneroid is of much utility, except possibly in mines where there are large unventilated goaves communicating with working places, but the recording barometer has the advantage of showing the tendency of the barometric pressure. Long observation of the barometric charts in one locality, combined with observations of the wind direction, temperature, season, and some knowledge of of the local meteorological peculiarities, will enable the observer to deduce certain probabilities from the trend of the barometric curve which, if linked up with perusal of the reports of the Government Weather Bureau, will prove of advantage to mine managers who are aware of underground conditions in collieries under their control likely to be affected by sudden barometric changes, or by unusually high or low readings.

Nevertheless, although the reading and recording of the barometer has been compulsory at most collieries for a good many years past, no tangible correspondence or connection between colliery explosions and the state of the barometer has been worked out.

At one time so-called "colliery warnings" were issued in Great Britain, giving publicity to unusual conditions of the barometer, and for a number of years these warnings were a source of mirth to colliery engineers, because the conditions they announced had in all instances come to pass before the "warning" was printed.

The science of weather prediction has made great strides in recent years. Nothing was more striking in the log of the "R-34" dirigible's voyage across the North Atlantic than the accurate weather observations and predictions. By the use of wireless messages, and the more careful weather observations which will doubtless be arranged and recorded by all civilized governments in the future, it may be possible for colliery managers to be accurately forewarned of coming atmospheric pressure variations.

At the best, however, the usefulness of the barometer to the colliery manager is small, and the best safeguard is, as pointed out by the British Columbia correspondent, to see that the mining law requiring the provision of adequate ventilation is properly carried out.

Another correspondent states that the barometer in the United States will average a range of from ½ to ¾ inch, and that the maximum range may be assumed as not exceed two inches, and this only rarely. Fluctuations of a greater range than this have we believe occurred on several occasions in Nova Scotia, particularly in the vicinity of the Bay of Fundy, but so far as ascertained no extraordinary conditions manifested themselves underground on these occasions of maximum and minimum readings.

The views of the readers of the Journal on this matter, and any particulars of unusual barometric variations with associated phenomena in connection with mine air which may have been observed, would be of general interest and value.

GROWTH, NOT "RE-CONSTRUCTION."

There is a tendency in trade periodicals in the United States to refer to conditions of trade and prices as they existed after the American Civil War, and from these conditions to draw inferences as to the trend of events after the Five Years' War just ended. Is it not a rather useless proceeding?

The territory, trade, transportation, population and industry of the United States when the Civil War ended were in no sense comparable or analagous to present day conditions.

During the Civil War the resources of America were wasted by civil strife, the destruction wrought affected only the citizens of the United States.

Preceding the entry of the United States in 1917 into the fight that commenced in 1914, the need of the Allies was the industrial opportunity of the United States, and probably the material help that was afforded by the munition plants of the United States to the Allies before April, 1917, was as effective in defeating the Germans as was the military and naval aid that was afforded after the United States came fairly into the lists. Further, thanks to her unimpaired and generous man-power, the United States was able throughout the progress of the war not only to afford ever increasing military assistance, but was able to keep her manufacing establishments working at full pressure on supplies for the Allies.

Since the close of hostilities, as well as preceding this, the food-needs of Europe were met by exports from the United States in very large part, and this work of both necessity and mercy, proved also very profitable to United States producers.

Moreover, the future will probably make demands on American exports fully as heavy as the country can supply, which means a continuance of profitable merchandising in Europe with the profit accruing to the United States.

Why, therefore, should the United States fear the problems of re-construction? They have none. The

problems of growth are more likely to trouble our neighbours.

The analogies of the aftermath of the Civil War would apply with greater accuracy to the future of Germany, or France. In these countries reconstruction is an actual and dire problem that will tax the courage and patriotism of all the citizens of these countries to the utmost.

All that has been remarked herein regarding the outlook of the United States applies to Canada. While the population of Canada offered, in proportion to their numbers, a much greater sacrifice to maintain the rights of man than did the United States, yet economically speaking Canada is a nation just as virile, and with more virgin potentialities than even our extremely numerous and wealthy neighbours.

There are scars in Canadian hearts that only time can heal, and memories and regrets that will out-last this generation, but, from the mere viewpoint of commercial prosperity and industrial permanence, Canada has no more a "re-construction" problem than has the United States.

Not a foot of Canadian soil—except the Ridge at Vimy—has suffered violence at the hands of our foes, and we have prospered materially. Perhaps the distribution of the material gains of war has been unfair, but industrially, commercially, financially, and politically, Canada never was so eminent as she stands to-day. Morally also, and in the springs of nationhood, has Canada been tested, and we are citizens of no mean country.

Let us, therefore, also cease lamenting the problems of "re-construction," and get down to work. It is growing pains this country has, nothing worse, and many of our troubles are nothing but a state of mind.

EUROPE'S DIMINISHED COAL PRODUCTION.

By the actual physical destruction of coal mines, by death in war and from war-diseases and war-caused famine; by the removal of miners to other occupation through conscription and personal preference, by deliberate reduction of production through shorter working hours, and by the unbalanced and unefficient character of the colliery working organizations—which is another aftermath of war—the coal-mining industry of Great Britain and Europe has become reduced to terrible straits.

While the suicidal tendency of coal-mining events have been long foreseen by those engaged in the commercial direction of the industry, it has apparently required the voice of a mining engineer from the United States to crystallise the situation, and it is to be hoped that no international jealousies will be allowed to lessen the weight of Mr. Hoover's utterances, which are made out of his technical knowledge of mining, aided by his unique knowledge of the internal conditions of Europe and his detached and disinterested viewpoint as a citizen of the United States.

Mr. Hoover points out that the coal production of Europe is reduced thirty-five per cent from the normal, that the problem is domestic to Europe and cannot be allieviated by coal shipments from this side the water because of the shipping shortage. Mr. Hoover is specific when he characterises the coal shortage as "the greatest menace to the stability of life in Europe," but we are certain that Mr. Hoover did not, as reported, state "the fate of European civilization now rests in the hands of the coal-mine owners of Europe," because the colliery owners have little or nothing to do with their mines nowadays.

The territorial adjustments have been largely influenced by considerations of coal, and the relatively smaller extent of coal-bearing territory now held by Germany, together with the larger areas now held by France and Poland will in due time exert weighty influences on the industrial progress and material wealth of these nations, but today the problem that faces all Europe alike is that of destroyed mines, dissipated working organizations, wrecked transportation systems, and highly organized groups of miners who know exactly what they want and precisely how to get it, but are careless of the effect upon the rest of mankind.

A further consideration is that a reduction in European coal production was approaching, whether there had been war or not. What is true of the British mines is true of all European mines, namely, that the best picking is gone, and what remains has to be won by increased effort, at increased depths, from thinner and inferior seams, and under conditions of cost which have to bear a large proportion of expenditures that should have been amortized and charged into the selling price of coal years ago. In one sense it may be said that coal is not so much dear to-day, as it has been sold at deceivingly cheap figures in former years.

United States papers, and many English papers also, make a great deal of the greater percentage of machine-mined coal in the United States, and intimate that the small production per man in British mines, and the greater cost of mining in Britain is largely due to the unprogressive attitude of the British coal-owner who will not use mining machines to the fullest possible extent.

If a comparison were to be made between the physical characteristics of the seams from which coal is to-day won in Britain, and the seams from which coal is now being taken in the United States, the comparison would remove a good deal of misunderstanding. Coal is being mined in Britain, and in Continental Europe to-day, under conditions of great depth, inclination of seams, faulting, inferior quality of coal, distance from the pit-mouth, drainage, ventilation, gas emission, thinness of seams, and drastic government regulations, of which United States miners have no conception.

Britain and Europe also is in the second stage of coal-mining to-day, a stage that has not been entered upon in the United States, unless it be in the anthracite mines.

To coal-mines operated under such conditions of failing extent, five years of time, and that war-time, makes a great difference. It is extremely unlikely that the European coal-mines taken as a whole, can ever again reach pre-war figures of production, and it will be a long long time before the collieries reach the maximum production of which they are capable, which, it may be re-stated will not equal pre-war figures. This condition might as well be faced by those who have the consideration of European coal matters. While lessened hours of labour will doubtless play its part in reducing the coal production of the future, the diminishing productivity of European coal-mines will be a factor less amenable to amelioration than labor efficiency.

No amount of mechanical coal-cutters will help this condition very much, or for any length of time, and it may be further remarked, in fairness to British coal miners and those who direct their work, that coal is being cut in Britain by mechanical cutters in seams so thin and deep that no United States mining engineer would consider the feat possible, unless possibly he also, like the British miner, was driven to mining under such difficult conditions by sheer lack of more easily mined coal. An advertisement in a well-known United States trade periodical refers to a pump installation in the "deepest bituminous coal-mine in the United States" in a shaft 1100 feet deep. The correctness of this figure is not ascertained, but in Britain 1100 feet would be considered a shallow mine, and one of the pressing problems of British coal-mines today is how to mine at great depths under conditions of high temperature.

"Only a greatly increased coal production, and improved organization for its distribution can save Europe from disaster next year," says Mr. Hoover, who further urged that some sort of fuel control be established to bring this about, but declined to accept the post of director of the proposed Commission, stating he believed the problem to be strictly European. In makink his statement, Mr. Hoover shows that he realises that European problems must be solved by Europeans, but the thanks of all are due to him for courageously telling some truths about the menacing aspect of the problem of coal supply.

The greatness of the coal necessity of Europe is shown by the statistics collected under Mr. Hoover's direction, which indicate a probable coal output in Europe next year of 443,000,000 tons, against requirements of 614,000,000 tons.

As an exporter of coal, Europe is completely and finally out of the running, which is not the least significant event in these upsetting and world-shaking days.

Admiral Tirpitz says: "The Germans never understood the sea. In the nation's fateful hour the fleet was not used. I can only write the epitaph."

But the British did understand the sea. It is their father and mother too. And the British Navy wrote the German epitaph.

THE IMPERIAL MINERAL RESOURCES BUREAU

The Imperial Mineral Resources Bureau, organized for the collection of information with reference to the mineral resources of all parts of the British Empire, has been incorporated. The Charter granted on June 12th, provides that there shall be representatives of the United Kingdom, Canada, Australia, New Zealand, South Africa, Newfoundland and India appointed by the several governments. The Secretary of State for the Colonies will represent all other parts of the Empire. There shall also be six other persons who "may from time to time be respectively appointed by the Lord President of Our Council for the time being, and after due consultation by him with all important interests concerned shall be the President and Governors respectively of a body corporate by the name of "The Imperial Mineral Resources Bureau."

The purposes of the Bureau are: (1) to collect, coordinate, and desseminate information as to the resources, production, treatment, consumption and requirements of every mineral and metal; (2) to ascertain the scope of existing agencies, with a view ultimately to avoid any unnecessary overlapping that may prevail; (3) to devise means whereby existing agencies can, if necessary, be assisted and improved in the accomplishment of their respective tasks; (4) to supplement these agencies, if necessary, in order to obtain any information not now collected which may be required for the purposes of the Bureau, (5) to advise on the development of the mineral resources of the Empire or of particular parts thereof, in order that such resources ma be made available for the purposes of Imperial Defence or Industry or Commerce.

Earl Curzon is the first President of the Bureau. The first Governors are: Sir Richard A. S. Redmayne, K.C.B., Chairman of the Bureau and Representative of the United Kingdom, appointed by the Lord President of the Council; Willet G. Miller, L.L.D., appointed by the Government of Canada; Thomas H. Hamer, appointed by the Government of Australia; William S. Robinson, appointed by the Government of New Zealand; Hon. William P. Schreiner, C.M.G.K.C., appointed by the Government of South Africa; Hon. Edward P. Lord Morris, K.C.M.G., appointed by the Government of Newfoundland; Richard D. Oldham, F.R.S., appointed by the Government of India; John William Evans, D.C., appointed by the Secretary of State for the Colonies and the following persons appointed by the President of Council; Westgarth F. Brown, Frederick H. Hatch, Sir Lionel Phillips, Edgar Taylor, Wallace Thorneycroft and Thomas Turner.

The success of the Imperial Mineral Resources Bureau will naturally depend upon the men who are its first Governors. In the list of names above are many well known among mining men in Canada. There can be little doubt that if these men meet frequently and do their best to perfect such an organization as is planned they will do great service to the industry and to the Empire.

In Dr. Miller Canada has an able representative on the Board of Governors. He will do his share towards making the Bureau really useful to the Empire and he will bring to his confreres reliable information concerning Canada's rich mineral resources.

The Revival of Local Ore Treatment: The "Journal" is pleased to be able to publish the text of the address on the revival of local ore treatment given by Dean Francis A. Thomson of the University of Idaho, at the International Mining Convention, held last June in Nelson, B.C.

A condensation of this address was contained in the report of the Nelson Convention contributed by our B.C. correspondent to the "Journal" of July 9th, but readers may desire to read the argument for the revival of the small smelter in full.

CORRESPONDENCE.

Sudbury, Ont., August 8, 1919.

The Editor of the Canadian Mining Journal,—

Dear Sir,—All who are interested in the Canadian mining industry must deeply regret the strike at Cobalt. But no one who is interested in genuine industrial peace, which can only exist on a basis of mutual good faith, can avoid sympathizing with the Cobalt mine operators.

The writer was in Cobalt twelve years ago, when the first strike was started and a "gentleman of the name of McGuire" was president of the local union. There could be no question as to the evils of policy and leadership where Mr. McGuire was concerned.

Then, as now, a large number of the steady men—the majority, I believe,—were opposed to the actions of the union officials. Yet they seemed to be unwilling to oust them from positions of trust they freely claimed the officials were abusing. Such unwillingness of the sane majority to control, and if necessary to repudiate, unwise leaders is an unfortunate weakness in many unions, including the Western Federation of Miners under whatever name it has appeared. The character of the union has not been the character of its membership, but of its active leaders. No sensible man can blame the Cobalt mine operators for refusing to deal with parasitical leaders, or for preferring to deal directly with the essentially sensible body of their own men.

The Montreal Gazette, as quoted by you sees more in the Cobalt strike than there really is: The spirit and good sense of the majority of the men are sound, but the men, individually and collectively, seem to be stricken by a strange helplessness when it is necessary to repudiate reckless, self-seeking leaders. This strike, engineered by the union officials, is not a manifestation of a political movement, but it is a selfish and heartless exploiting by the union officials of the instinctive loyalty of men toward each other.

Yours truly,

ANOTHER ENGINEER.

Brussels, July 10th, 1919.

The Editor of The Canadian Mining Journal,—

Dear Sir,—We wish to present to you a matter that is of more interest to the mining machinery companies of Canada who are looking for business in Europe than it is to ourselves.

To explain: We are receiving many inquiries and corespondence from Canadian mining machinery concerns, which mostly are inadequately stamped. We do not mind in the least paying the extra postage, but we think it possible that European concerns here who may receive similar insufficiently stamped correspondence, might think that Canadian concerns should acquaint themselves with this matter. We cannot find time or trouble to write to each individual company that addresses us as pracically all these companies are guilty of this lack of knowledge or attention, and we thought that in the interest of mining industry you could perhaps find in your magazine space for a short message stating that you had received notification from Belgium that a three-cent stamp is insufficient on letters and a five-cent stamp is necessary. I state it in this way as one firm replied to us that they were told at the post-office this was sufficient; but our regulations here say a five-cent stamp and of course we are governed by the latter.

We extend you our thanks for the attention you will give to this matter and remain,

Yours very truly,

JUALIN ALASKA MINES CO.,

E. G. ASHBY,

Chief Accountant.

Note:—This letter was submitted to the Postmaster of Montreal who replies: "The rate on letters to Belgium is five cents for the first ounce, or fraction thereof, and three cents for each additional ounce."

GRANBY WORKMEN GET HIGHER PAY.

Anyox, August 5.—With the price of copper soaring and maintaining a level of twenty-three cents per lb. flat from smelter to refinery for the two weeks ended August 1, the Granby Consolidated Mining, Smelting & Power Company has posted another advance in wages to men in its employ. A twenty-five-cent raise per day to all men, which was posted on July 16, has now been capped with a further increase of fifty cents per day, effective from August 1. Notice to this effect is now posted at the Granby works here and at adjoining properties owned by the company.

The latest increase places this camp in the list of those paying the highest wages of any camps on the North American continent. All the Granby workings are under the eight-hour plan.

Since the signing of the armistice ending the great war increased prices in copper have resulted to date in an increase of wages over the basic scale of $4.25 per day, miners now receiving $5.75 per day straight time of eight hours. Muckers get $5.25 per day and common labor is paid for at the rate of 6½ cents per hour, or $5 per day.

A R. Roberts, lately of the firm of Burns & Roberts, Toronto, has severed his connection with the firm and opened offices under his own name at 201 Bank of Hamilton Building, Toronto. He will handle contractor's power plant and railway equipment.

The Revival of Local Ore Treatment

By FRANCIS A. THOMSON,

Dean, School of Mines, University of Idaho.

(Notes from an Address delivered at the International Mining Convention at Nelson, B.C., June 20th, 1919.)

One of the outstanding features of metallurgical economics during the past 30 years have been the consolidation of treatment plants at strategic centres. This was of course the logical and inevitable result of what our socialistic friends call "economic determinism." It would seem, however, that for causes which I shall attempt presently to show, this movement has about reached its maximum and that the pendulum is due to swing in the opposite direction.

Those of you who are familiar with metallurgical history will recall that prior to 1890 there were only three ore-treatment processes in general use, viz.: Amalgamation, Smelting, and the numerous more or less unsuccessful leaching schemes. During this period little smelters dotted the landscape wherever there were mines, unless the ore were readily amendable to amalgamation; and this was usually true only while the mine was working in the oxidized zone.

Throughout the Western States were hundreds of little smelters operating often inefficiently and always expensively because of lack of variety in their ore supply. This situation continued until the period of consolidation, which might be dated from 1890 to approximately 1920.

In British Columbia out of nine or ten plants formerly in active operation, Pilot Bay, Nelson, Sullivan, Revelstoke, Vancouver, Trail, Van Anda, Crofton, Ladysmith and Northport (a British Columbia smelter built in Washington, and no longer to be counted as a British Columbia asset), Trail alone survives. In the Western States, Tacoma, the Selby Plant at San Francisco, two or three plants at Salt Lake, one at Denver, one at Leadville, and one at East Helena, at Northport and at Kellogg represent the hundred or more smelters, large and small, of which they are the lineal descendants and successors in interest.

Monopoly, yes, inevitably under the circumstances; stifling of competition of course, due to the immutable laws of chemical combination.

The smelting business is as natural a monopoly as the street car business, or the telephone business. That does not mean it should be free from scrutiny, quite the contrary indeed.

Let me illustrate briefly and simply by a hypothetical case. Suppose we have three mines, A. B. and C., each producing 200 tons of smelting ore, and each manager smelting this at his own mine. A. has a silicious ore; B. an iron ore; C. a limey ore. Let us assume further in order to make the thing quite concrete, that each ton of ore requires a ton of flux and that the total smelting cost per ton of furnace burden is, let us say, $4. Then the cost to A. to B. and to C. will be $8 per ton of ore smelted; that is $4 per ton of flux, which yields no valuable product. Now if the smelting of these three ores can be carried out at one centrally located plant with a capacity of 600 tons, the cost under the conditions assumed, will probably be less than $4 per ton, plus freight, so that the central plant will be able to charge $5 or $6 per ton, make a profit of $1 or $2 and cut the cost for A., B. and C. of a like amount, thereby making a profit of $500 to $1,200 per day, and a saving to the three mines concerned of a like amount.

This illustration is, of course, schematic, and not at all exact, it will serve nevertheless to demonstrate the logic and inevitability of smelter consolidation. Yet I believe we have gone about as far as we are going in that particular direction — not that I think Trail is going to be put out of business and that we are going back to the days of the little inefficient smelter, but that metallurgical developments of the last 30 years, beginning with the application of the cyanide process by McArthur and Forrest in South Africa, here made it evident that smelting has no longer the supremacy in ore treatment which it formerly enjoyed. This situation is due to the developments in two fields, flotation and hydrometallurgy.

As long as recoveries by water concentration were hovering around 70 per cent, direct smelting was often, indeed I would say, in most cases, preferable, because of the higher recoveries possible by smelting. With the coming of flotation, making possible recoveries of 90 per cent or better, smelting is no longer necessarily preferable as a primary treatment process—and hence the field of raw ore smelting is being continually narrowed and more and more the smelters are being embarrassed by receipts of larger and still larger tonnages of flotation concentrate.

Meanwhile great strides have been made in the field of hydrometallurgy. This is perhaps best exemplified in the case of zinc, the hydrometallurgy of which has progressed by leaps and bounds in the last five years. The leaders in this work have been the metallurgists at Trail and at Anaconda, and while there has and probably will continue to be a good deal of dispute as to who was the inventor or discoverer of this process, it must be said of the men at Anaconda and Trail, as was said of McArthur and Forrest in the historic cyanide controversy, that "They converted what had heretofore been a pretty chemical scheme into a sound commercial success." Indeed so successful has electrolytic zinc become that in spite of predictions to the contrary, it will be able to stay in the market in competition with retort zinc even at the present low price levels.

Leaching of copper ores, both oxidized and semi-oxidized, is being carried out on a large tonnage basis in the south-western States and in South America. So far as sulphide copper ore is concerned, not much progress has been made, but there is no inherent reason why a method similar to that employed for zinc-roasting, followed by sulphate leaching, should not be successfully developed.

The hydrometallurgy of lead lags behind that of her sister metals, perhaps because of the relative insolubility of lead compounds. There is promise, however, in the new process for the volatilization of lead and silver in the form of chlorides, followed by recov-

ery in Cottrell Treaters, phenomenal extractions having been made with this scheme on a large laboratory scale.

Gold and silver we can always recover, if the cost is justified, by cyaniding, sometimes as in the case of gravity or flotation concentrate from gold or silver ores, only after roasting however.

Now in most cases these hydrometallurgical methods neither require nor justify centralized plants, provided any one mine or district can supply sufficient ore to ensure the minimum tonnage necessary for economical operation. The great advantage which lies in mixing ores for smelting does not apply to hydrometallurgy at all. In fact, each ore is likely to require slightly different treatment and the plant treating the ore from one mine is likely to have the simpler problem. Coke supply—always a bug bear to the lead and copper smelter need no longer be considered, cheap fuel can be used for roasting if indeed the ore does not practically furnish sufficient heat for its own roasting. In zinc, and in copper to a less extent, probably also in lead as its hydrometallurgy is developed, there will be need for abundant and cheap electric power, this, however, can be transmitted to any point readily if it can not be developed near at hand as is usually the case except in the desert regions.

There is a further general advantage possessed by hydrometallurgical methods, namely, that the residue or tailing is readily amenable to further treatment, a condition not true of slag, the pyrometallurgical residue.

For these reasons therefore I believe we face an era of decentralization in metallurgy and that in view of what has been said concerning flotation and hydrometallurgical development, I am convinced that the next 25 or 30 years will witness a renaissance of home treatment. This will, of course, by no means make the large centralized plants, such as Trail, superfluous, far from it, for they will have more to do than ever although the nature of the material they are called upon to treat may be somewhat different.

The net result will of course be the treatment of more ore, of lower grade ore, and the production of more gold, silver, lead, copper and zinc on both sides of the 49th parallel, for these problems are common to Canada and the United States, and they are being solved co-operatively, and with the freest interchange of information and ideas.

H. M. COMMISSIONER REPORT ON ONTARIO'S MINERAL INDUSTRY.

In the report of the British Trade Commissioners on the Trade of Canada and Newfoundland for the year 1918, the mining industry of Ontario receives attention. Mr. F. W. Field, who was a short time ago appointed His Majesty's Trade Commissioner at Toronto points out that the production of minerals is large and varied, and that the prospects for increasingly large outputs are good, the greater part of the undeveloped areas of the province being of pre-Cambrian formations, which are the chief productive rocks in this part of Northern America.

Mr. Field is an Englishman who has resided for several years in Ontario. He is well informed on financial and industrial conditions, and can be depended upon to furnish reliable information concerning the trade of the province. Much of the information in this report will prove of interest to all Canadian as well as to the British manufacturers who are specially served by the activities of the Trade Commissioners.

SAND AND GRAVEL IN ONTARIO.

Report by A. LEDOUX.

Part Two of the Ontario Bureau of Mines Report for 1918 consists of a monograph on the sands and gravels of Ontario by A. Ledoux.

The Report, it is explained, should be considered only as a preliminary one, deposits in over forty counties having been visited during four months of field work, thus allowing only a very short time for detailed examination of any deposit. Under these circumstances, the extended scope of the monograph, and the very full and detailed information it contains, is evidence that no time was wasted by its author.

The Report begins with a review of the characteristic properties of sand and gravel, and the methods of testing applied. These properties have been divided into morphological, physical and chemical. The origin and occurrence of the sands and gravels are explained, such considerations being of practical interest, as there is a close relation between the geological origin and the qualities of sands and gravels. In numerous cases continuous lines of deposits, marking ancient lake shores, may be followed in southern Ontario. An interesting map is included in the Report, showing the trace of the ancient shore lines and channels of Lake Iroquois and Lake Algonquin, which occur within the Province of Ontario.

"Most of the sand and gravel deposits in southern and eastern Ontario are very closely connected with the geological history of the Great Lakes. Just as the present shore lines do not show continuous deposits of sand and gravel, the old shore lines are marked by isolated zones or areas more or less parallel to the present shore lines."

On the shores of existing lakes certain parts are marked by extensive beaches containing abundant reserves of good building material.

Attention is also directed by the Report to some artificial sands made by crushing soft sandstones, suitable for special purposes such as glass-making and iron-smelting.

Moulding sands are found in the vicinity of Hamilton and Ontario. It is seldom more than two or three feet thick, appearing generally as a deposit under the superficial soil, when this soil comes in contact with an underlying sand formation. It seems to owe its origin to the circulation of water and to the action of vegetable and other organic life. It occurs in different grades of fineness, the coarsest material being used for large and rough castings, while very fine moulding sand is used for brass and copper castings. As, says the Report, this is a high-priced sand which can be exploited without expensive equipment, "there is a possibility of developing a considerable industry in this material for Canada.

Glass sand, which should be as pure as possible, is sometimes obtained directly from the pits, and sometimes as at the plant of the Oneida Lime & Sand Company near Hagersville, is prepared by crushing a more or less disintegrated sandstone. This particular product is prepared from Oriskany sandstone of Devonian age, which after crushing and washing contains sometimes as high as 99.5% of pure silica.

Some of the Ontario sands appear to be suitable for the manufacture of silica bricks, a product that is badly needed in Canada, but no instance of their manufacture in Ontario was noticed in the Report, although the suitability of the sands for this purpose is pointed out, and analyses of typical quartz sands are given.

An interesting quartz occurrence is located at Bellevue, at mile 21 on the Algoma Central Railway. From 6,000 to 8,000 tons a year of this material is shipped, principally for the use of the Algoma Steel plant. The rock has a faint pink tinge. It sells for $1.25 to $1.50 per ton at the quarry, and freight costs about 40 cents. The rock analyses 97.25% of silica, and 1.86% of iron, with traces of alumina and lime.

The Report contains numerous well-chosen and typical photographs, and like all the Ontario Bureau of Mines publications, is well printed. The Province of Ontario is apparently well supplied with sands and gravels, of differing characteristics, and of considerable applicability to the arts and to the industries already existing in Ontario.

Complete lists of the producing deposits are given, with names of operators, class of product and output, and a full index to the monograph is appended.

BUREAU OF MINES REPORTS ON GOLD AREAS.

The Ontario Bureau of Mines has just published reports on the Abitibi-Night Hawk Gold Area and the Larder Lake Area. The former is the work of C. W. Knight, A. G. Burrows, P. E. Hopkins and A. L. Parsons. The Larder Lake report is by Mr. Hopkins.

The Abitibi-Night Hawk Gold Area.

The Abitibi-Night Hawk Gold Area is the name given by the Ontario Bureau of Mines to that part of Northern Ontario embraced by geological map No. 286. The area is roughly bounded on the west by Frederick House river. Night-Hawk Lake is in the south-west corner of the map and the town of Cochrane in the north-west corner. The eastern boundary is the Ontario-Quebec provincial boundary.

The western half is crossed in a south-easterly direction by the T. & N. O. Ry. of which the terminus is at Cochrane. From Porquis Jct. the Porcupine branch runs south-easterly, and a short line runs north-westerly to Iroquois Falls on the Abitibi River where a great pulp and paper plant is located. From east to west the northern part of the area is traversed by the Canadian National Railway.

In considerable part of this area the predominant rocks are altered, volcanic rocks, which the authors of the report call Keewatin greenstones. Since it is gold deposits in such rocks that are yielding nearly all the gold that is being mined in Ontario the geological staff of the Bureau during the field season of 1918 devoted its attention to the mapping of this area. The map just published and the accompanying report indicate where the rock outcrops are and their nature. With this available the prospector will be able to use his time to greater advantage than before.

While little was known about the geology of the area, two important ore deposits had been developed; the Croesus gold deposit in Munro townships and the Alexo nickel deposit near Porquis Junction.

An unusual feature of the area is the occurrence of Keewatin lavas so little altered that a series of flows could be recognized. The authors found in Holloway township 14 distinct flows having a combined thickness of 4,400 ft. Features characteristic of the upper portions, middle and lower part of flows were readily observed.

In most cases where gold has been found in the area there are dykes of siliceous composition, such as feldspar porphyry, intruding the greenstones.

The authors of the report describe several gold deposits, including the Croesus, Howey-Cochenour-Willans and the Ratz. Some information concerning several other gold properties is also given. Reference is also made to nickel, chromite, pyrites and asbestos occurrences. Unusual magnetic declination was found in Frecheville and Rand townships.

The Larder Lake Gold Area.

The Larder Lake Gold Area described by P. E. Hopkins includes the properties of the Associated Goldfields Mining Company, and of La Mine d'Or Huronia, as well as a promising prospect on Sharp Creek in Heart township. Mr. Hopkins' preliminary report on the area was published in the Canadian Mining Journal. Some additional information will be found in the report just published.

Mr. Hopkins says of the rusty-weathering carbonate rocks in which the gold deposits at Larder Lake occur "rusty weathering carbonate rocks are found in or near many of the gold areas of Northern Ontario. This type of material has been prospected to a considerable extent in various parts of Ontario without yielding any producing mines. These rocks are more widely distributed in Larder Lake than elsewhere, and are important since they appear to contain a greater quantity of gold than the other rocks of the area.

R. E. H.

ENLARGING PLANT AT HUNTINGDON MINE.

The Eastern Mining and Milling Co., Ltd., which is operating under lease and option the Huntingdon copper mine near Eastman, Quebec, has placed orders for additional machinery to increase the capacity of the ore treatment plant. Developments at the mine continue favorably. The map showing the location and surface plant of the Huntingdon mine, illustrating Mr. R. E. Hore's article in last week's issue was omitted through a delay in transit, and will be found in this issue (see page 605.)

PERSONALS.

Mr. George R. Rogers has returned to the properties at Wasapika after a visit to Toronto.

Mr. G. C. Bateman has returned to Toronto from Montreal and New York.

Mr. F. M. Connell has returned to the Huntingdon mine after a brief visit to Toronto, where he ordered additional machinery for the mill.

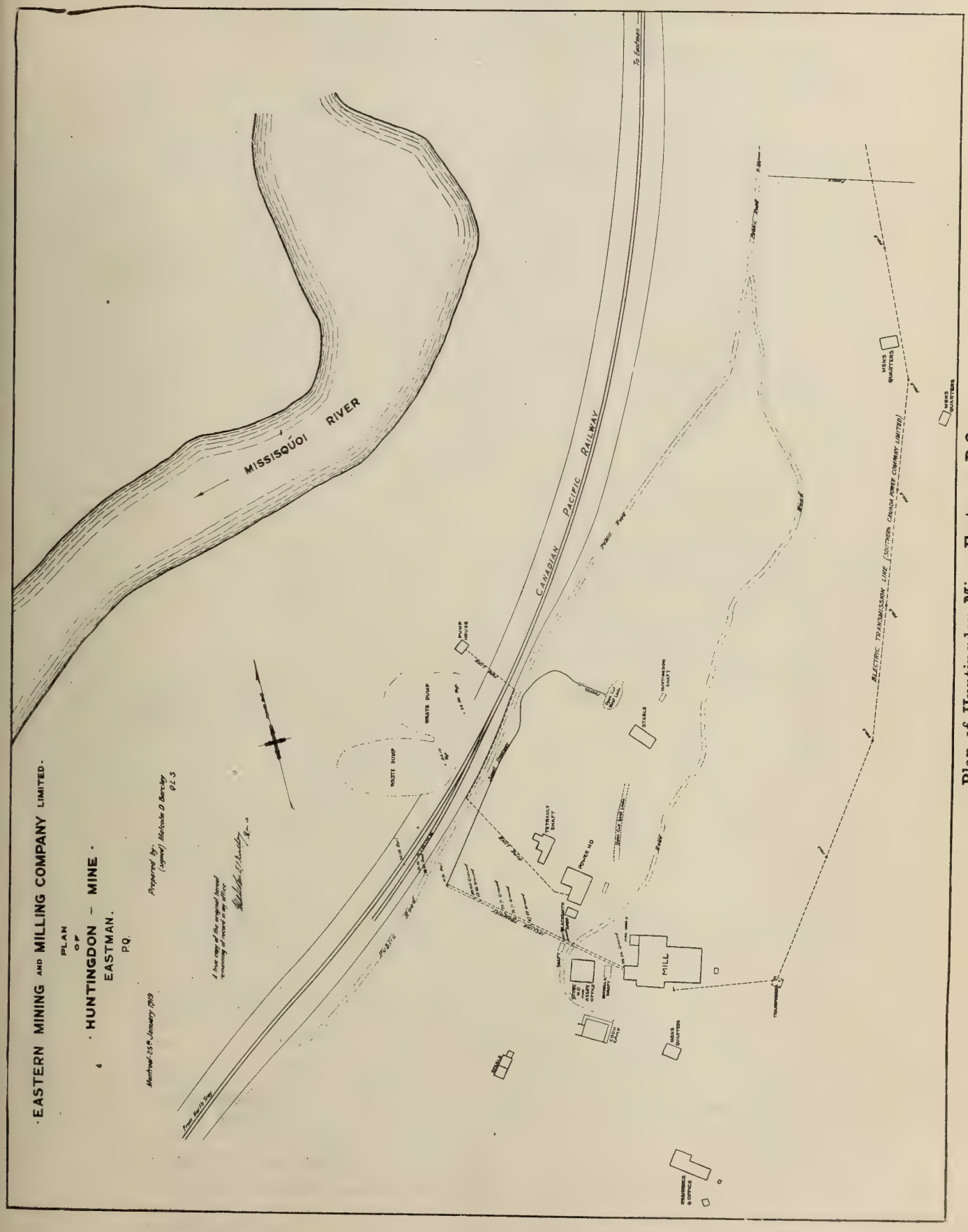
Mr. R. E. Hore is taking up professional practice as consulting geologist. His office will be, as at present, 1402 C.P.R. Bldg., Toronto. Mr. Hore will act as consulting editor for the Canadian Mining Journal.

Dr. W. G. Miller of Toronto, is one of the first Governors of the Imperial Mineral Resources Bureau which has been granted a charter of incorporation.

Professor H. E. T. Haultain is in Minnesota studying the Minnesota Mines Experiment Station.

BOUNTIES ON PETROLEUM

The amount paid in bounties on crude petroleum (the only bounties now being paid) in 1918 was $113,497 for 6,566,133 gallons, and for 1917, $101,428 for 6,761,886 gallons, the total from 1905 to 1918 being $2,791,937 on 183,462,142 gallons, as given in the Canada Year Book for 1918.



Plan of Huntingdon Mine, Eastman, P.Q.
(See Journal of August 6th, 1919, pp. 594-6.)

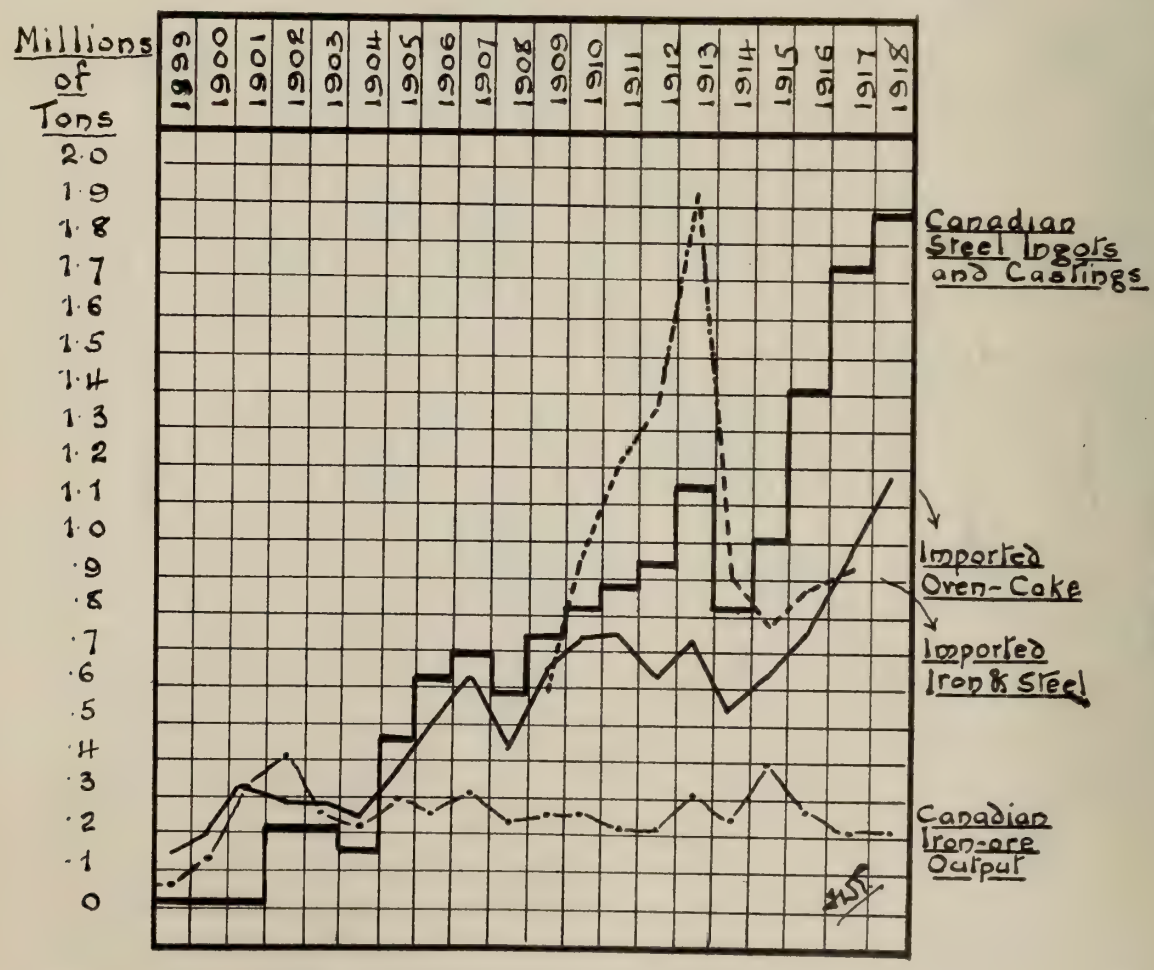
The Production of Coal and Iron Ore in Canada Considered in Relation to the Iron and Steel Industries

By the Editor, in "Iron and Steel of Canada."

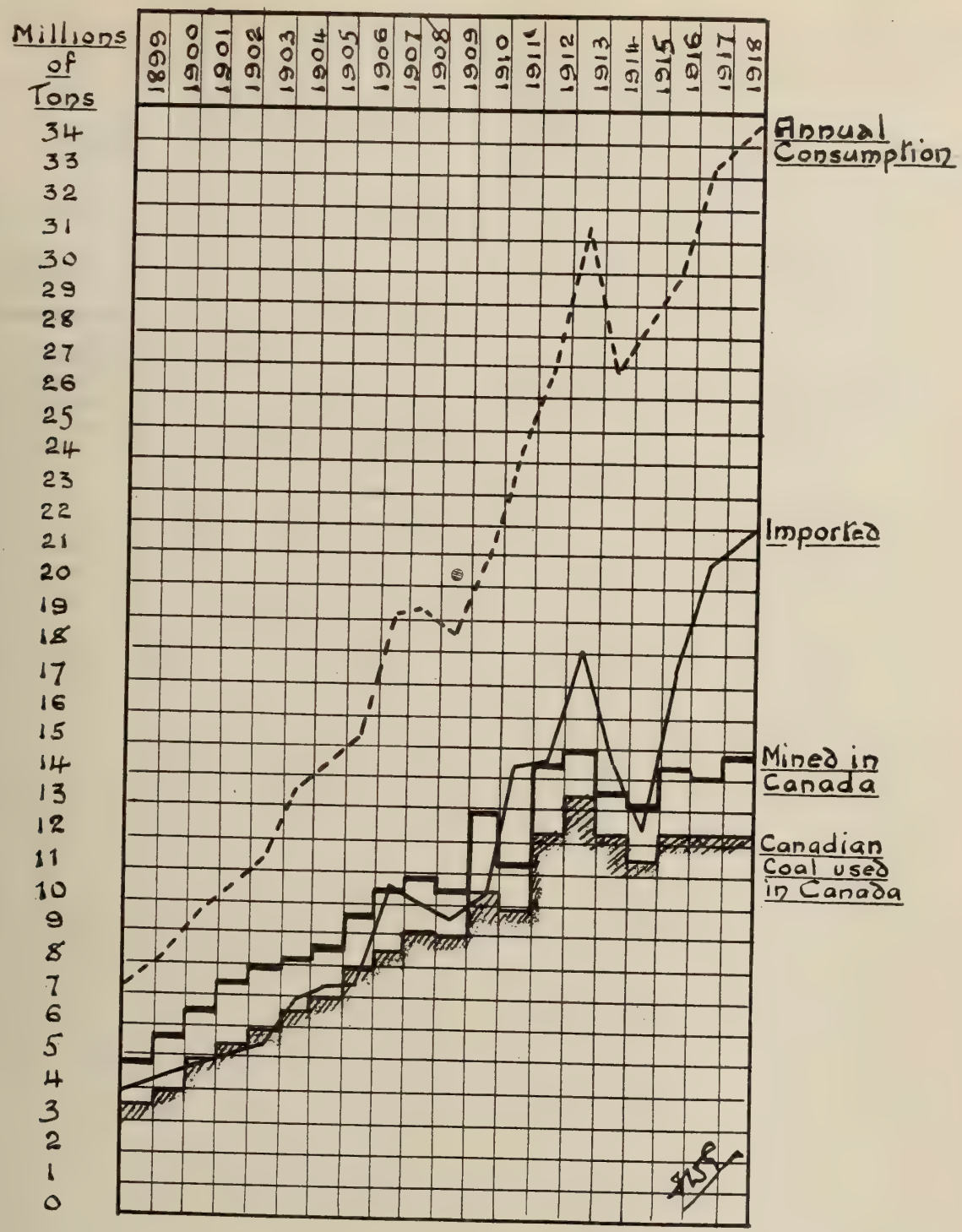
The two graphs accompanying are compiled from the Department of Mines statistics. The graph illustrative of Canadian coal consumption shows that up to about 1912 the Dominion was able to furnish from its own coal-seams a little better than half the tonnage of coal consumed for all purposes in Canada. Actually, however, this was not the case, as a certain amount of coal was exported, chiefly from the Cape Breton mines to Boston, Mass. During the period 1886 to 1899 the coal imported into Canada averaged a little over 54 per cent of the total coal consumption of the country. During the period 1899 to 1918, included in the graphs, the same percentage was maintained, but during the war period the percentage of coal imports has greatly increased. At the present time the imports have risen to 63 per cent of Canadian consumption of coal

The coal consumed in Canada during 1918 is estimated at 34,840,000 tons, the highest figure recorded in Canadian statistics, and most closely approached by 1913 when 31,582,545 tons of coal were consumed. The consumption per capita shows a steadily rising figure, and this is encouraging as showing Canada's progress in the industrial arts and in the conveniences of civilized life, but the discouraging feature diclosed by a study of the statistics is that the Dominion is rapidly increasing its importations of coal, at higher prices than have ever prevailed in the past, and at the same time the home production of coal, shows a stationary, and even a declining tendency. Any form of production in Canada that is stationary is unsatisfactory, and is equivalent to a declining production when viewed in relation to the general growth of population.

There is this difference between the jump in coal consumption that marked 1913 and the peak figure of 1918, namely that in 1913 Canadian coal-mines were increasing their outputs coincidentally with the



— Production of Iron-Ore and Steel Manufacture in Canada. —



— Production and Consumption of Coal in Canada —

increase in coal imports, but in 1918 the imports of coal are climbing without precedent, while domestic coal outputs are declining with no immediate prospect of manifesting an opposite tendency.

Turning to consideration of the graph showing tendencies in the iron and steel industry, it will be noticed that the tonnage of steel ingots and steel castings produced in Canada has climbed rapidly during the war period. This, of course, is a war condition, and does not represent the industrial growth of the Dominion with accuracy. Nevertheless, the peak reached by imports of iron and steel in 1913 is still higher than the record achievement of Canadian iron and steel plants in 1918, showing that a home market exists and that the producing capacity of the domestic iron and steel industry is required to fill Canadian requirements to a very important extent.

The curve of imports of furnace coke should be considered in relation to the imports of United States coal, and discloses that Canadian steel plants are largely dependent both for coal and coke upon an outside source.

The tonnage of iron-ore into Canada is not shown,

partly because no reliable figures are available, but also because it is unnecessary after inspection of the curve of Canadian iron-ore production. The production of domestic iron-ores is now practically confined to the Province of Ontario. Nova Scotia and New Brunswick, which in former years were important contributors to home production of iron-ores, now produce little or none. It should, of course, be noted that the ore used in the Nova Scotian steel plants, at Sydney and Sydney Mines is Wabana ore, controlled entirely by Canadian interests, but, at the same time, it would be incorrect to class this important part of the tonnage of iron-ore smelted in Canada as of Canadian origin. That is a possibility of the future, politically speaking.

With the exception of the years 1899 and 1900 it will be noted that Canadian production of iron-ore was smaller in 1918 than in any year of the period under review.

A summary of the tendencies disclosed by the graphic representation of statistics of the allied industries of coal and steel in the Dominion includes therefore the following points:

a. Decrease in home production of the essential raw materials of coal and iron-ore, accompanied by a rapid increase in importations of these materials, including a notable increase in the importation of coke.
b. A rising tendency in the importation of iron and steel products into Canada, accompanied by a maximum production of steel in the Dominion, with the probability that a falling-off in steel production may be looked for during 1919. It is not, however, certain that a corresponding decline is likely in imports of iron and steel.

The conclusions to which these consideration would appear to lead is that Canadian steel producers should strenuously cultivate the home market, which appears to have a purchasing capacity worth cultivating.

It appears equally desirable and feasible that Canadian coal producers should strive to lessen the recently developed inequality in the ratio of imported coal to coal mined in Canada. Admitted that a certain tonnage of anthracite coal is probably required for domestic use because of its greater cleanliness, there is yet a large market for bituminous coal in Canada that is being filled to-day from United States sources.

Apart from the fact that raw materials obtained from outside sources provide employment in that outside source and not in the country where they are used—at least not in the same proportion—there is the further consideration that we are to-day paying for imports with a depreciated currency.

In a lecture recently delivered to the staff of Barclay's Bank, in London, Professor Nicholson says with reference to conditions in Great Britain:

> "We are suffering in the first place from "over-importation. During the war a great "part of this over-importation was of the "greatest national benefit. The imports from "America were necessary for the conduct of "the war. But an increasing part of the aggre- "gate money value of these imports was due "to the inflation of the currency and the as- "sociated rise in prices. This part was not a "blessing—quite the contrary."

While a wholesale application of Professor Nicholson's statement is not justified in regard to all the considerations set out in the foregoing remarks, yet in relation to the coal consumption of Canada, the statement is one of fitting exactitude. In brief, we are importing altogether too much coal and we are purchasing it at an increasing disadvantage.

Special Correspondence

BRITISH COLUMBIA.

Cork-Province Increases Capital.

The capital stock of the well known Cork-Province Mines, Ltd., of Kaslo, B.C., has been increased from 1,000,000.00 to $1,250,000.00 and the par value is now $1.00 instead of 10c.

There has been an offer made for 400,000 shares, which is the balance of the Treasury stock, but before this offer will be accepted the stockholders will be given until Sept. 15th to take these shares up at 25c per share. If not taken up by the stockholders by that date the offer will be accepted.

The proceeds of this sale will be used in development work, part of which will be used to develop more power, and thus be able to operate on a 24-hour basis.

Nelson.

The Inland Mining Company has bonded the Eureka Mines, situated on Eagle Creek from the Eureka Copper Mines, Limited. The amount involved is $60,000, of which $17,000 has been paid. The same company has the Granite-Poorman property at Granite, B.C., under bond and proposes to operate the two properties. Already the Granite mill is operating on Eureka ore. Improvements to the Granite-Poorman plant are proposed among which is the extension of the tram-line from the mill to the Eureka workings. The Inland Mining Company is composed of mining men of the State of Washington, H. H. Vinvent of Walla Walla being manager, and Alfred Bachtold of the same city, secretary. The mine superintendent is B. Crilly, of Nelson, B.C.

From the Sheep Creek camp, where there is at present considerable mining activity, comes the report that two good showings have been located on Fawn Creek, one of the principal tributaries of the Sheep. The larger of these is on the Iron Dollar group owned by Neil McColman and Murdoch McLeod, who have been doing development work on the vein for a long time. Recently they have opened up the lead in a new place where it has a width of twenty feet and shows considerable milling ore and some shipping ore. On the headquarters of the Fawn Creek is the Wonderful group held by Mr. Phil Billings. Mr. Billings has sunk a small shaft on lead which now is twenty feet down and the ore has consistently improved. Fawn Creek is one of the lower tributaries within the Gold section of the camp.

Good progress is being made in driving a long tunnel on the Queen Mine, Sheep Creek. This is now in over 1,200 ft. At a distance in of 700 feet the tunnel crosscuts the Yellowstone vein and it is expected to catch

its objective the Queen Vein, at about 1,500 ft. From the intersection of the cross-cut with the Yellowstone vein, a drift has been carried in an easterly direction for 200 feet, proving the ore on this vein to be variable in grade. A W. McCune, who has the entire Queen property under bond, from the Queen Mines Incorporated, is responsible for the foregoing information. The object of the present development is to gain depth on the Queen vein, which has produced much good milling ore in the past. The Queen has a twenty stamp mill and a compressor, both operated by water power.

The Orinoco group of mineral claims in the Nelson district is reported to have been sold to United States capitalists for $60,000. A considerable body of copper silver ore has been exposed by ground sluicing and open cutting.

West Kootenay.

The Perrier Group of mineral claims, situated near Nelson, B.C., are being examined by Trevor Starky, the mining engineer of London, England, on behalf of capitalists who are considering bonding them. The proposed financial consideration has not been stated but it is said that if the negotiations are consummated, between $50,000 and $60,000 will be available for the further development of the property. These claims have been opened up to the extent of sinking a shaft on hundred feet, drifting 150 feet, and a small raise. Some difficulty was experienced at the outset with water which necessitated the installation of a hydraulic automatic pump. Ore and concentrates shipped in the past amounts to about 40 or 50 tons, and about $4,000 has been taken out in the form of bullion. The ore is averaging about $14 a ton.

Another property near Nelson, B.C., receiving attention is the Emerald Mine on Iron Mountain. A small concentrator with a capacity of 30 tons of ore running two shifts a day is to be installed.

Sandon, B.C.

The Blue-Bird and Rawdon claims on Reco mountain, near Sandon, B.C., have been purchased by Clarence Cunningham and associates, from the Montgomery heirs in New York for $35,000, under a bond and lease for three years. Operations already have commenced in developing and putting the property on a shipping basis.

It is reliably reported that the Rambler-Cariboo Mines has purchased claims adjoining its present holdings. The property which is situated near Three Forks, B.C., consists of two claims, the price of which is said to be in the neighborhood of $75,000. The claims acquired contain about 1,600 ft. of the vein from which the Rambler-Cariboo Company has produced a considerable quantity of good paying ore.

A strike of some importance is reported to have been made on Silverite property, owned by Clarence Cunningham. In drifting on the vein an ore shoot has been encountered with high values in silver. This property is situated in the vicinity of the old Queen Bess mine, out of which Mr. Cunningham made a considerable stake.

Revelstoke, B. C.

O. T. Bibb, president of the Multiplex Mining and Power Company, speaks very optimistically as to the future of the district adjacent to the town of Revelstoke, from a mining standpoint. He says that excellent progress is being made in the development of the Woolsey group of claims, and that the Lanark mines at Illicellewaet is also showing up well. This property has been under development for a number of years, and the company has installed a modern concentrating plant. Recently a new body of ore was discovered which decidedly increased the output. Some shipping, both of ore and concentrates, has taken place. In the North Bend District (north of Revelstoke, the Mastodon Mine, which was closed down for a time, has again opened up. This is a silver, lead and zinc proposition. In the Lardo district several parties of engineers are at work who are interested particularly in properties in the neighborhood of Goat Mountain. Prospects are being inspected by other parties in the Fergueson and Trout Lake Districts. Mr. Bibb states that his company proposes installing a concentrator on its property near Revelstoke as soon as possible.

The Silver Creek mineral claims situated near Revelstoke have been bonded to W. H. Eldridge, formerly of the Trail smelter, who proposes to proceed with developments.

Marblehead Quarries to be Reopened.

Having been closed down practically throughout the war the quarries of the Canadian Marble and Granite Works, located at Marblehead, will be reopened immediately. G. B. Wilson, the manager, recently returned from the east, where he was in conference with James Carruthers, his principal. Mr. Wilson has left for Marblehead with a crew of men to commence sawing operations. In a short time a polishing crew will be employed. A considerable quantity of stone is already quarried and only awaits finishing. The huge seam or bed of marble at Marblehead, said to be really almost a marble mountain is unique and one of the wonders of the country. A thoroughly modern plant was installed some years ago. It includes at the quarry derricks, oilers and hoisting engines, three drills and three channelling machines; at the mill four gangs for sawing marble; in the polishing shop which is operated by electricity generated by steam power, rubbing bed, planer and polishing machines; and machine shop.

Merritt, B.C.

The Aberdeen Mine on Ten Mile Creek is being unwatered preparatory to a careful examination of the property by engineers representing British interests, while T. J. Corwin, manager of the Aberdeen Mine Syndicate, is not prepared to make a statement as to the property's future, it is understood that in the event of the engineers making a favorable report, finances will be available for the reopening of the mine and equipping it with a concentrator and a mill.

Kaslo, B.C.

The Index Mine, situated on the South fork of Kaslo Creek is to be provided with a very complete operating plant. The equipment includes compressor, Pelton wheel, rails and ore cars. A dam and water flume already has been constructed. There are four leads on the property which are being developed by a crosscut, which is now in the first lead and which ultimately will give a depth of a thousand feet on the fourth

lead. The first vein has a good width of milling ore with a shoot of twenty to twenty-four inches of pay ore, which is now being sorted for shipment.

Fort Steele, B.C.

Gold placer mining operations are being carried on at Wild Horse Creek, near Fort Steele, on a considerably larger scale than for the last few years. The Gamble Company, after a twelve days' run, closed down operations owing to a break in the flume line on Boulder Creek. To test the ground a clean-up was made while the repairs were in progress, with results more than satisfactory. The Wild Horse Dredging Company, with leases covering the bed of the Creek from Kootenay River up about five miles, is working steadily to get its machinery in operation.

Trail, B.C.

The announcement has been made that James J. Warren, who has held the office of General Manager of the Consolidated Mining and Smelting Company of Canada for a number of years, has been elected to the Presidency of that company. Mr. Warren's preferment has created favorable comment throughout mining circles in this province.

Grand Forks, B.C.

A compressor plant has been installed at the Maple Leaf Mills Franklin Camp. H. W. Young, the Manager, states that work will start immediately in the further development of the property. Two shifts will be employed in driving the tunnel which now is in some sixty feet, it being planned to do several hundred feet of tunnelling in opening up the property. The Union Mine, of the same camp, also is being energetically developed.

Yale, B.C.

Diamond drilling operations have been started on the property of the Aspen Grove Amalgamated Mines, Limited. Surface indications promise an extensive zone of medium grade copper ore and to prove this it is the intention of the company to do some 10,000 feet of drilling. The drilling started by the Provincial Government on the Snow-storm Group in Highland Valley continues and the results so far are promising.

Cowichan, B.C.

The Lenora property, Mount Sicker, Vancouver Island, has been bonded by G. B. Turner, representing New York interests, and there are indications promising a revival of copper mines in that district. It will be remembered that the operations of the Lenora Mines ceased years ago when the property appeard to be exhausted. Mr. Turner, however, has started a shaft from which he intends to cross-cut the formation north of the fault, an area left untouched by previous development. There are no indications of copper on the surface, but a small vein has been encountered. It is interesting to note that the Tyee and Lenora Mines combined have produced over $3,500,000 in copper and gold, of which $500,000 was derived from the gold recovered. Mr. Turner is reasonably sure that he is putting a theory to a practical test that will result in a renewal of mining activity in the Mount Sicker Section.

The B. C. Manganese Company, Limited, is developing the manganese products situated near Cowichan lake. A railroad is being built to connect the E. & N. Railway with the mine. Bunkers are being constructed at the mine and a water system has been installed. Already contracts have been arranged to start shipping almost immediately to the Bilrowe Alloys Company, Tacoma. The company has also been asked by the Canadian Consolidated Mining and Smelting Company, Trail, B.C., for a supply of manganese ore. Dr. T. L. Walker, Professor of Mineralogy, University of Toronto, visited the property recently and commented very favorably upon it.

Portland Canal.

There is no section of British Columbia attracting more attention in a mining way than Portland Canal. Hon. William Sloan, Minister of Mines, recently made a tour of inspection of the district. From Stewart he went inland to Salmon River and visiting the Premier, Big Missouri and other mining properties of the locality. On his return he spoke very optimistically of the outlook. He reported that development is in progress not only on the Premier but also on the Big Missouri in which Sir Donald Mann is interested, and on other first-class prospects. Mr. Sloan stated that in order to facilitate the opening up of the mineral resources of this section considerable road construction is necessary. The owners of the Premier mines were building eleven miles of road from Hyder through American territory to the Boundary line. The Provincial Government would assist in the building of the road from that point to the mine and also in the opening up of roads and trails to other properties in the vicinity. He observed that there could be no reasonable doubt that the prosperity following successful mining operations would mean a material expansion in trade. It was the opinion therefore that Canadian merchants should be alive to the opportunity offered. The Dominion government was spending a considerable sum in the construction of a wharf at Stewart and the British Columbia administration was constructing a road from Stewart to Hyder at an expense of approximately $30,000. It will be seen, therefore, that the Government realize the importance of providing necessary transportation. He concluded by stating that present indications were that some of these properties would develop into first-class mines and that the whole district was rich in mineral resources. Mr. Sloan also visited the smelter of the Granby Consolidated Mining and Smelting Company at Anyox, B.C., and travelled over the Grand Trunk Pacific as far as Smithers, where he was in consultation with a number of mine operators of property situated on Hudson's Bay Mountain. He promised that the Government would extend some assistance towards providing roads and trails to the Colorado and Victory mining claims as well as other properties situated in that district.

Alice Arm, B.C.

The railroad from Alice Arm to Dolly Varden Mines has been completed, and the loading chutes on the company's wharf have been finished. It is not expected to be long therefore before the Dolly Varden is again on the shipping list.

The LaRose mine has started active operations and the North Star should be shipping at an early date. The latter has a good tonnage of ore on the dump. The Vanguard Group also is being put in shape for shipment of ore while the United Metals Company has open-

ed up a face of lead and grey copper ore that is reported to assay very highly. The Joplin Mineral claims, the ore of which goes high in silver, is being developed with encouraging results.

One of the most interesting mining deals of the year is the reported bonding of George Copper Mines in the Beaver River section of the Portland Canal Division to the American Smelting and Refining Company. These mines consist of ten claims situated six miles from the terminus of the Portland Canal Short Line Railway. Three mineralized belts have been explored on the property and are known as the Blue Vein, the White Vein and Green Vein. The Blue Vein comprises three veins aggregating ten feet of quartz in a fifty foot mineralized belt. The belt has been traced by open cuts for a thousand feet and the ten feet of ore averages $4.00 in gold and 3 per cent of copper. The white vein has been traced for tw othousand feet, measures four to six feet in width, and in places contains a high grade copper ore. Consideration is said to have been $1,000.

B. C. PERSONALS.

Mr. W. G. Trethewey, now of Sussex, England, but formerly of the Coniagas & Trethewey Mines of Cobalt, in which district he is well known, was a recent visitor to British Columbia.

Mr. Trethewey has been looking over some properties here. He is a great believer in British Columbia, and just as soon as conditions right themselves in England will probably locate in B.C. Like many other investors, Mr. Trethewey states that labor conditions will have to become more settled in England before any moves can be made to make active investments here.

Mr. Alexander Sharp, the prominent coal mining engineer of Vancouver, who has charge of M. P. Burns' property at Coalmont, has resumed practice again after 10 days' illness.

Mr. Sharp is to deliver a lecture on cheaper and better coal before the B.C. Chamber of Mines at an early date.

B. C. Chamber of Mines Will Exhibit at Fall Exhibition in Vancouver, September 8 to 13 Inclusive.

Arrangements are fast being completed for an exhibition of British Colmbia's mineral resources at the Fall show of the Vancouver Exhibition Association.

The Association is lending every possible aid to the B.C. Chamber of Mines, to make this exhibit a success. They have given the Chamber of Mines space for the use of nearly all of one of the principal buildings right near Hastings Street Entrance to the Park. This means that the first thing the visitor will see is the mineral exhibit.

Everything is being done by the Chamber of Mines to make this exhibit exceptionally attractive. It is planned to have an assay furnace in actual operation, also many other features that will demonstrate actual operations in connection with the mining industry.

Exhibitors Please Note: A hearty invitation is extended to those wishing to exhibit specimens of British Columbia minerals from any section of the Province. Same may be shipped care of the "Mining Exhibit, Vancouver Exhibition Association, Hastings Park, Vancouver, B.C.," and the Association will pay the freight or express charges on same.

Exhibitors should bear in mind that it isn't the size of the specimen, but the quality that counts. Have a full description of specimen, location of property and any other particulars of interest with name of owners. Mark everything plainly so there will be no confusion in properly marking exhibit.

Mine Supplies.—Manufacturers of mine supplies and equipment firms will also exhibit and there promises to be one of the best supply exhibits ever held. Much machinery such as drills, etc., will be in actual operation. All firms wishing to exhibit will do well to get in touch with the Secretary of the British Columbia Chamber of Mines, Dominion Bldg., Vancouver, B.C.

Cobalt Strike

UNION EXECUTIVE REJECTS PROPOSAL OF SOLDIERS' COMMITTEE.

Cobalt.—After a full discussion on the local strike situation with the Minister of Labor, the deputation of returned soldiers returned from Ottawa on the seventh, and reported to a mass meeting of the returned men. They informed the meeting that the Minister of Labor would, on the request of either party to the dispute, appoint a Board of Conciliation, with full power to bring about a settlement. The findings of such a board are, of course, not necessarily binding on either party unless mutually agreed upon, but the Deputy Minister pointed out that in at least nine cases out of ten a board of this kind has successfully obtained its objective. If either party refuses to appoint a representative, the Minister of Labor will name one to represent that party.

The Deputy Minister further pointed out—and this point seems to have been completely overlooked at Ottawa — that the mine managers are an organized body, and therefore, that one Board of Conciliation can be appointed to cover all the mines in the camp, rather than having a board for each mine.

A Board of Conciliation cannot become operative unless all employees have returned to work.

The deputation therefore recommended that this proposal be adopted, since it meant that work in the mines could be recommended immediately, with a fair prospect of the ultimate adjustment of all points at issue.

The meeting then adopted the report, and instructed the committee to take up the proposal with the executive of the Miners Union, and, if they deemed it advisable, ask the Union Executive to hold a vote by secret ballot of all the workers in the camp as to whether they wished to return to work immediately, pending the result of a Board of Conciliation.

In the evening the committee held a meeting with the Union Executive. They pointed out that if the men returned to work immediately, pending a Board of Conciliation, a very great deal of hardship would be done away with, that work could be recommenced immediately, that even if the findings of the board were not binding, yet the chances were very strongly in favor of its findings affecting coming legislation in a manner beneficial to the workers, and that Cobalt and the surrounding district could look forward to a period of prosperity rather than one of depression and real hardship.

The miners' executive replied to the effect that, unless the operators conceded some points, they would not entertain the proposition, and that they considered it inadvisable to take a vote on the question of returning to work on the conditions proposed by the soldiers' committee.

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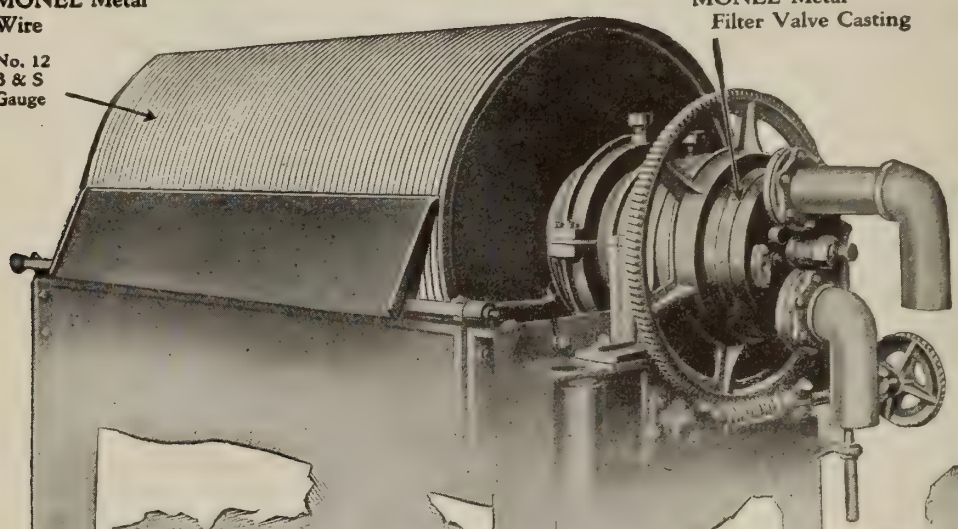

U. S. Ammonium Nitrate Plant
Perryville, Md.

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TO eliminate shut-downs, MONEL Metal screens were used for supporting the filter cloth and MONEL Metal wire for winding the drums of the 20 Oliver Continuous Filters at the U. S. Ammonium Nitrate Plant, Perryville, Maryland. The action of the liquor was so severe that screens made of iron, copper or practically any other metal could not be used.

MONEL Metal wire wound spirally over wool fabric (see illustration) gave permanent service. One MONEL wire, taken off and rewound over new fabric nine times, was still in perfect condition for further use. This is a typical example of MONEL Metal's wonderful resistance to acids and its superiority over other metals for equipment used in the chemical field.

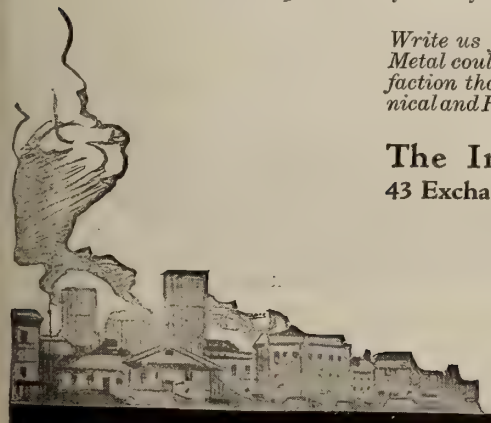
MONEL Metal is very generally employed in manufacturing parts of bleaching and scouring machinery and dyehouse equipment which come in contact with acids or strongly alkaline solutions.

MONEL Metal is a natural alloy of nickel and copper — non-corrodible — strong as steel — tough and ductile. Withstands acids, high temperatures and erosive action of hot gases and superheated steam. Can be machined, cast, forged, brazed, soldered and welded by electric or oxy-acetylene method. Takes and retains a perfect nickel finish.

In the mining field where corrosion is unusually injurious, MONEL Metal has proved its superiority over other metals for mine screens, coal chutes, valve trim, pump liners, pump rods and various other parts of mining machinery and equipment. Send for the MONEL booklets which tell all about this unique metal and the many other uses for which MONEL Metal has proved superior.

Write us for detailed information as to whether MONEL Metal could be substituted with economy and greater satisfaction than the material you are now using. Our Technical and Research Department is at your service. Address:

The International Nickel Company
43 Exchange Place **New York, N. Y.**



INCo NICKEL TRADE MARK

THE INTERNATIONAL NICKEL COMPANY

Special Correspondence

BRITISH COLUMBIA.

Test of the Fleet Process of Electric Smelting.

Having the financial support of the Provincial Government to the extent of a grant of $2,000 the Vancouver Magnetite Iron and Steel Smelting Company, of Vancouver, B.C., has arranged for a test of a new electro smelting process which, it is hoped, will prove that the magnetite ores of British Columbia can be treated electrically with the assurance that the quality and cost of the product will permit it to meet competition in the open market. This company, of which J. H. Fraser, of Vancouver, is the managing director, is the owner of the Ronaldsay plant, Howe Sound. The experiments, by arrangement with the B. C. Electric Ry. Company, are being facilitated by the use of the latter's old power plant at Highland Station. The Provincial Government, through the instrumentality of the Minister of Mines, has shipped a quantity of magnetite ore from Texada Island properties. Wm. M. Brewer, District Mining Engineer, has had charge of this work which he reports to have been completed. The furnace is expected to be blown in on or about the 6th of August. Representatives of the Department of Mines are to be in attendance. Wm. D. Fleet, of Montreal, is the inventor of the process on trial. He was superintendent of the Canadian Copper Smelting Company at Sudbury, Ont., for six years and later installed the electrical equipment of the hydro plant of the Calgary Power Company at Kananaskis and Horseshoe Falls. Subsequently he was a member of the Manitoba Public Utilities Commission.

It is interesting to note in this connection that general interest in the problem of developing the iron and steel industries in this province continues. The Hyatt Steel Products Company reopened its rolling mill at Port Moody recently after temporary embarrassment due to a strike. Several improvements have been made to the plant, as a result of which it is possible to turn out both a larger quantity and a better grade of steel than heretofore. Public sentiment is behind the proposal that these small firms and any other concern which might be induced to launch an iron and steel industry should have every encouragement. Many think that the Dominion Government should supplement the bonus now offered by the Provincial Government on pig iron produced within the Province from local ores. They take the position that if the resources of Canada are to be developed this basic industry must be stimulated, pointing out that less than five per cent of Canadian iron enters into iron and steel products manufactured in the Dominion, although there are unlimited quantities of raw material available.

An editor can feel grateful for such freedom of his pen as comes from the fact that he is called upon to write on matters that do not affect the pocket nerve of his advertising supporters. Such detachment—not degenerating, however, into vacuous aloofness—is the best guarantee of reasonable independence; absolutely independent no human being can be, for every man has prejudices and pre-occupations that color his views of life; but we confess that the editorial ideal, expressed though it may be with some lack of literary refinement, is the truly American notion of living so as to be able to look any man in the face and tell him to go to hell, most politely, most politely.—Mining & Scientific Press.

BARTER.

Bills of exchange and sight drafts fade afar,
With tedious detail of the ocean trade;
And dreaming I can see past foam and bar,
Primeval barter; in this eastern raid
Essential oils and simsim seeds are spread
For gleaming cutlery and iron bars;
And eyes strain westward where the sun sinks red,
Seeking a market under alien stars.

Textiles are asked in trade for caraway,
And coriander for enameled kid;
In ardent Africa the merchants pray
For roaring motors; in their eager bid
They offer almonds and pistachio
And dates conveyed through distant desert haze
On patient camels rocking to and fro,
Through far, entrancing, slow Algerian days.

Thos. J. Murray in the New York Times.

PRESIDENT OF THE INSTITUTION OF MINING ENGINEERS VISITING CANADA.

G. Blake Walker, the President of the British Institution of Mining Engineers is visiting Canada and the United States, and is expected to arrive at Quebec about the 23rd of August. Mr. Walker is one of the best known mining engineers in England. He is a charter member of the Institution of Mining Engineers, past President, and Hon. Secretary of the Midland Institute of Mining & Mechanical Engineers, and the recipient of a number of medals from the technical societies in Britain in recognition of his services and the interest he has taken in the problems surrounding the safety of coal mines.

The Deister Concentrator Company of Fort Wayne, Ind., have had prepared for distribution a very interesting map of Europe revised to show the new boundaries agreed on by the Peace Conference in comparison with the old outline of all countries. It bears the imprint of the Deister Concentrator Company from a publicity standpoint, and will be sent free to any of the readers of the Journal on request of the company.

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EDITORIAL

THE WORK OF THE BUREAU OF MINES GEOLOGISTS.

During the past few weeks there has been in the "Toronto World" a great deal of criticism of the work of the Ontario Bureau of Mines. The criticism is quite unfair to the geologists employed by the Bureau. Very good work is being done, as many who have used Ontario Bureau of Mines reports and maps will bear witness. The Province is getting a lot more out of these men than it is paying for. The real cause for complaint is that a larger number of such men are not available for the work.

The mineral resources of Ontario are being more and more rapidly developed. It is regrettable that the Bureau of Mines has not a large enough staff of geologists to enable it to have promising areas mapped at a speed in keeping with that of exploration, but that is the fault of the province, not of its present employees.

No men have a better reputation among mining men than the chief officials of the Ontario Bureau of Mines. Mr. T. W. Gibson, the Deputy Minister, is known here and in the United States as an exceptionally competent director. Dr. W. G. Miller, the Provincial Geologist, is not only a distinguished geologist, but is a leading figure in the mining industry. It is true that he has been recently spending more of his time in England than in Ontario, but the province needs a capable representative there and no one is better qualified to bring Ontario's mineral resources to the attention of the Imperial Resources Bureau than is he. We would be glad to see him back on his job in Queen's Park, but it is idle to say that in his absence the Bureau is not doing good work.

Most of Ontario's metalliferous deposits are in pre-Cambrian rocks. The geologists of the Bureau — Knight, Burrows and Hopkins—are successfully studying and mapping these formations. There is more to be done than they can do in a reasonable time, but they should be given credit for what they are doing.

We could say more in praise of the work of the Bureau of Mines if we thought it good policy. Being convinced that the work should be speeded up in order that development of our mineral resources may come more rapidly and more intelligently, we are not so anxious to direct attention to the past activities of the Bureau as to the future. We need more work of the kind that is being done. The quality is satisfactory, but there are not enough workers to produce the desired quantity. Every year's delay in the development of our mineral resources means a loss to the province. If the writer in the "Toronto World" would give the Bureau proper credit for the work that it is doing, we would welcome his direction of the "World's" readers to the necessity of the province making a great effort to achieve faster progress.

CO-OPERATIVE RETAIL ASSOCIATIONS.

Dr. McFall, the Dominion Cost of Living Commissioner accuses the Retail Merchants' Association of openly and secretly opposing the growth of co-operative retail associations, and in doing so he discloses a thing that has been well known to those interested in co-operative stores.

The attitude of the Retail Merchants' Association is one that interests mining companies, as the hostility of the merchants has been extended to mining companies and corporations operating retail stores with the object of reducing the cost of living to their employees. A recent example of this policy is the intention of the gold companies at Timmins to operate a co-operative retail store with the express intention of reducing retail prices.

The Dominion Coal Company and the Nova Scotia Steel & Coal Company for many years have done the same, and throughout the war period these stores exercised a salutary and steadying influence on retail prices. Naturally, this excited the opposition of the retail merchants, who were almost able to promote legislation prohibiting the coal companies from operating their stores. No grounds were advanced for such action by the legislature except the deterrent effect of the competition of the company stores upon retail profits, and strange as it may seem, the Legislature of Nova Scotia were on the eve of acceding to the importunities of the retail merchants to abolish the company stores, and the merchants have still much hope that their efforts will eventually remove these stores as competitors.

The extraordinary presumption of the merchants went even further, for they asked that co-operative retail associations should be prohibited, and opposed the incorporation of co-operative societies in Nova Scotia. It seems strange that a body of men presumably so well-informed as the retail merchants should have so elementary a knowledge of the unassailable right of a group of persons to incorporate for any form of business that is not against the public interest or actually felonious, as to dare to publicly oppose the formation of a co-operative society, but it actually was done.

More effective than the public opposition of co-operative associations, however, is the secret policy of wholesale and retail men in refusing to sell goods to co-operative societies. The wholesalers are compelled to such a course of action by the attitude of the retailers, but it is well-known to co-operators that much of the difficulty experienced by co-operative buyers in Canada is occasioned by the secret understanding that exists amongst retailers that co-operative societies are not desirable from the retailer's point of view and are to be discouraged by every possible means.

In Great Britain the same hostility was experienced, and the co-operators were forced into commencing a wholesale society, which is now familiarly known as the C. W. S. and has achieved world-wide influence.

The Commissioner believes that the new law restraining combines in Canada may make it possible "to compel the retailers to refrain from threatening to boycott wholesalers and manufacturers who sell to co-operative associations." We should hope that it may be possible to do this. It does not seem a great deal to ask. Co-operation is not an experiment. It has proved very effective in saving the services and the profits of the long line of middlemen, commission agents, jobbers and retailers that do the distributing work of commerce. If co-operation dispenses with any of these interpolations between the producer and the consumer, it is so much to the general public good. The middleman, of all grades, is only a useful member of the community in so far as he performs a service. To that extent he is entitled to reward, but if the middleman should become obsessed with the idea that he has a vested interest and some occult right to profit from the purchases of the public, irrespective of the necessity for his services, then he becomes an incubus, a parasite, and will in due time meet with the fate of all things and institutions that perform no useful purpose.

THE CANADIAN NATIONAL RAILWAYS AND THE PURCHASE OF NOVA SCOTIAN COAL.

In a letter addressed to the President of the Canadian National Railways, Mr. D. D. MacKenzie, the member for Cape Breton North, pleads eloquently the case of the Nova Scotia coal mines in requesting a larger allotment of the coal purchases of the Canadian Government Railways.

Mr. MacKenzie touches upon the two main reasons for the present exclusion of Nova Scotia coal from its usual markets, namely, the shortage of ships occasioned by Admiralty requisition, protracted beyond all reason; and, secondly, the great drain upon the colliery working organizations, and their permanent impairment caused by heavy voluntary enlistments and an unusual percentage of casualties among the miner-soldiers. The late leader of the Opposition concludes by writing:

> "I must with all respect, yet with all insistency, impress upon you the necessity of coming to the assistance of these men by purchasing the article which they produce, whether or not it may be more expensive than the same article imported from a foreign country. This is not only a national question but an imperial one. . . . The reasons you gave for not buying more of our coal do not measure up to the gravity of the situation involved."

The reasons given by Mr. Hanna for not buying more coal from Nova Scotia than was needed in the Eastern Lines section of the C. N. Railways, east of Levis, or thereabouts, was that Nova Scotian coal cost much more than American coal.

Is the cost of an article, purchased by a national enterprise for national services the true measure of economy or statesmanship? Nova Scotian coal is costing more because of the sacrifices in life and services made by Nova Scotian miners, and because of the admirable manner in which the foresight of Nova Scotian coal owners had provided cargo carriers so excellently adapted to the Admiralty requirements that they were requisitioned early and released late. American coal is costing less than Nova Scotian coal because it will always and did always cost less to mine, and because, thanks to the draft system and the lessons learnt from our experience, the United States coal mines were not drained of productive labor, but, on the contrary, the U. S. Government went to extraordinary pains to conserve and increase the production of what they realized to be the most essential raw material for war purposes. In other words, the United States coal trade benefited by Canadian sacrifices, and it is rather a poor return for the injuries that the war inflicted upon the coal trade in Nova Scotia, that because of the preferential position now occupied by United States coal operators, **occasioned by these same injuries,** Nova Scotia should be called upon to suffer further injury.

But, admitting that the Canadian National Railways can save large sums of money by buying United States coal in substitution for Nova Scotian coal, what does that really amount to? Do we not owe sufficient money to the United States already? Is not a five per cent premium on New York funds enough discount on the Canadian dollar to worry about? As we have pointed out in these columns many many times the importations of American coal are only exceeded in their tremendous increase by the deplorable halt in Canadian coal production, and it appears as if the Government itself were going to lead the procession towards the United States coal-heaps, and were going to set a good example by spending more money in the United States for coal that could be and should be produced in Canada.

If large numbers of men in Nova Scotia are thrown out of employment by the substitution of American coal, if sums for relief have to be voted by municipal, provincial and possibly federal agencies, if the royal-

ties of the Province of Nova Scotia are still further reduced by a still further diminishment of output, if more miners are compelled to leave Nova Scotia and go to the United States for a living, if the revenues of government accruing from taxation on exciseable goods and customs duties are diminished by unemployment, if the general commercial prosperity of Nova is diminished; and if all these benefits are transferred to the United States in the measure and extent represented by the tonnage of coal that is mined in the United States that should be mined in Canada, how does the country benefit, and where is the saving in money? Is not the saving an entirely fictitious one, existing only on paper, and represented as a material factor by an increased rate of exchange against Canada and poverty and distress within our borders?

If the reason given by the Canadian National Railways for buying United States coal in preference to Nova Scotia coal, or buying United States coal at all where coal is obtainable from Canadian sources, is that it costs less, then, as Mr. MacKenzie says, the reasons given do not measure up to the gravity of the situation. Very few people realize—even in Nova Scotia itself — how black the outlook is for the future prosperity of the coal trade in that province. It is one of the limitations of Nova Scotia that coal, in the nature of things, always did and must always cost much more to mine there than it does in the United States. This is a limitation Nova Scotia shares with Britain and other coal producing countries in the Empire. If the Canadian Government wishes to see coal mined in Canada, and to receive all the internal benefits that accompany coal mining, then the Government must accept the limitations of Canada, and not buy goods in the States because they are listed lower in dollars and cents, because that does not mean that they cost less. In these days money has a variable and often unascertainable value. If we persist in buying goods abroad, then we must be content to accept unemployment at home, and this, in turn will result in inability to pay for the goods purchased, or national bankruptcy.

SIR AUCKLAND GEDDES' SPEECH ON BRITISH COAL PRODUCTION.

The speech in which Eir Auckland Geddes presented the gravity of the coal situation in Britain attracted world-wide attention, and cabled summaries of the speech were contained in most Canadian newspapers. The coal question is one which concerns Canadian readers, not only because the commercial effect of the disappearance of Britain as a coal-exporting nation will extend to Canada, but because the questions that are in dispute between the miners and employers in Britain are the same questions that are being raised in Canada. Sir Auckland Geddes sums the matter up by saying: "The key of the position, the final key, rested with the miners, not on any Report, but by working."

There is a curious similarity in the statements of coal-miner leaders in all parts of the world. In Canada, in the United States, in France, and even in Germany, the colliery managers and coal-owners are accused of restricting output by inadequate and antiquated equipment, by inefficient management, and other sins of omission. The simultaneous discovery of the managerial shortcomings, and their simultaneous announcement in coal-mining districts so far separated as Alberta and Westfalia, as England and the United States, in language moreover that is identical in intent if not in phrase, is an instance of mob phsychology, or thought transference, or something more sinister, or else the mining engineering profession has undergone a remarkably widespread and consistent deterioration all at once.

However that may be, Sir Auckland Geddes' exhaustive setting-forth of the problems that face the British nation through the special and preferential treatment demanded by the miners contains much that is as pertinent to Canada as to Britain.

THE LIGHT RAILWAY.

In a recent number we suggested that a light railway such as was used in France might be advantageously constructed into the West Shiningtree and Wasapika areas. Such a railway would certainly be of great assistance to those who develop gold properties in this and adjoining districts and would enable operators to spend a higher percentage of their funds on the development of ore deposits.

A correspondent says: "One of the unquestioned successes of the war was the light railway and Canadian railway troops had their share in this success. Consequently, we have men who are experienced, and no doubt the Government if it wished could get plenty of applicants for employment of this nature. The light railways offers a cheap and speedy means of opening up the hinterland which in the near future will be a source of untold wealth to the present Canadian transcontinental railways and incidentally to Canada as a whole."

PERSONALS

Mr. W. E. Segsworth, is in Toronto having returned from an extended visit to England.

Mr. D. H .McDougall, President of the Nova Scotia Steel and Coal Company, has returned from a two weeks visit to Wabana Mines, Newfoundland.

Mr. G. Blake Walker, President of the Institution of Mining Engineers (Great Britain) is visiting the timber areas near Bonne Bay, Newfoundland, in which he is interested. These areas were acquired during the war by a syndicate of Midland coal-owners to provide pit-timber for the British collieries, but owing to shipping shortage it was not found possible to send pit-timber to England during the war period. With the close of the war, it is expected that the Company's plans will be followed out.

THE PRICE OF COAL

SIR AUCKLAND GEDDES' SPEECH.

The proposed increase of 6s. per ton in the price of coal formed the subject of debate in the British House of Commons on Monday, July 14.

Sir A. Geddes (President of the Board of Trade) said there was no ground for the suggestion that this increase in the price of coal was based upon political considerations. It was based upon a realisation by the Government of the very serious position by which the country was faced at the present time in connection with the supply of the main source of power. The causes that had been assigned for the reduction of output were numerous. It was quite wrong to suggest that all these causes were to be found inside the coal industry itself. There were many outside causes, and he proposed to look at those causes under two heads: first, the external causes, and then causes internal to the coal industry. Among the most important of the external causes was the present transport position in the country. Output was being checked at many mines because wagons were not forthcoming as required, the failure being in some cases extraordinarily serious. The records of the arrival of the general user wagons at some 40 specially affected pits showed that those 40 pits in pre-war loaded some 10,000 general user wagons in a week, in addition to privately owned wagons. At these same pits during a recent week it was possible to have present waiting for loading only some 700 wagons. That was, of course, not an average for the whole country; it was taking the worst group of cases where this factor tending towards reduction of output operated. As to why wagons were not provided, there were many reasons operating to strangle the flow from the collieries, one of them being that the coal, after being loaded on the wagons, was longer on them than it used to be, because they could not be cleared at their destination. As a result of the institution of the eight-hour day on the railways, there was less work being done, and the new men who were being taken on were not so well trained or so expert. A further factor was that the work was over sooner, and there was consequently a delay in getting the wagons back.

The Interdependence of Industries.

A great difficulty had arisen in connection with the whole of the railway system through the enormous freights which had to be charged for coastwise service and those in turn arose from changes in general conditions of employment. Much higher wages were being paid, and in some cases less work was being done. He laid stress on these points to emphasise the fact—the recognition of which was vital to the country at the present time—that less work being done in one industry reacted through that industry on to others, and we could not go on with anything like our old pre-war state if the work of the country was not done. At the present moment, for one reason or another, it was not being done. A most pernicious doctrine was being preached—that if a man did less work it left more work for others to do. The real thing was exactly the reverse. We had here an example of less work being done in industries outside mining, making it impossible for another industry to get the flow of its products away, and therefore checking back the work in that industry. That fact should be clearly recognized. This question of the interdependence of industries was complicated by other factors. For instance, the drought we had in the early summer was also a contributing cause to blocking back coal, as it caused a shortage of hay,and people who used to do carting, and in that way help to clear the railways were no longer doing that carting because it did not pay. That the fact had added to the difficulty of the coal output. Not only was the flow from the coal industry checked by conditions of labour and employment in industries outside itself, but the actual production within the industry was checked by conditions arising in industries outside itself. There was at present the greatest possible difficulty in getting forward to the mines the steel rails, the machinery, and the tubs which they required, and those difficulties were accentuated by a change in the hours of labour and the amount of work done per day in the steel and other industries. Consequently, it was not possible at the present moment to get the supplies of manufactured steel required for other industries. These were some of the outside factors. In short, you could not take an old country such as this, and suddenly profoundly change the conditions under which the majority of its peoplee lived and worked, without causing widespread disturbances outside the area of those changes themselves.

Inside Factors Reducing Outputs.

Inside the coal industry there was no doubt that there were factors at work tending to reduce output. As the result of the Government's adoption of the recommendations of the Interim Report of the Sankey Commission, the coal owners' profit was now fixed at 1s. 2d. per ton. It did not matter to them, therefore, how much a ton coal cost to raise, although the number of tons raised did matter. Taking the side of the men, wages were very much up. It was freely alleged that there were men working in the industry who found they had made enough in the course of the week, and did not go on to make more. He thought that was probably true. The figures of absenteeism in the mines suggested that something of that sort was happening. The White Paper stated the percentage of absenteeism due to sickness, injury and voluntary absence, shown as a percentage of the possible number of shifts which could have been worked, increased from an average of 10.7 per cent. in 1913, to an average of 12.5 per cent. in the first 20 weeks of 1919, and to an average of 13 per cent. in the four weeks ended May 24. That was another factor at work tending to reduce output. The Coal Control Department reported that absenteeism was less last week, but the figures showed that during the time covered by the White Paper there was an increase in absenteeism. There was also during the same time a reduction in the out put of mines for a period of four weeks, increasing from 19.8 tons in 1913 to 16.8 tons in the first 20

weeks of 1919, and to 17.1 tons in the four weeks ended May 24, during which period there were no holidays and few stoppages. For the last four completed weeks, excluding Whitsuntide, the output was 16.7 tons. Those last figures by themselves, of course, proved nothing, because there were factors operating from outside. But, as a result of those figures, there was no reason to doubt that there was still an unused capacity for output existing within the coal miners themselves, and that point was, he thought, fully conceded by a member, himself a miner, when he said that if there was a campaign to get an increase of work in the mines he was quite sure something would be done. This very wide range of causes in connection with the reduction of output was something which could not be put right at once, and something which no single man and no single body of men representing any one industry could put right by their own efforts. It must be a national effort to get this vital question of coal output put right.

Prices Compared

As a result of the reduction of output there must be some increase in price. The following figures showed where the money paid for coal at the pit-mouth went in 1913, and what consumers would have to pay after July 16, first of all per ton of coal raised, and secondly per ton of coal available for sale. The average pit price for coal per ton raised in 1913 at the pithead was 10s. 1½d., and the corresponding figure to-day was 26s. 0½d.; per ton sold the corresponding figures were 11s. and 29s. 3½d. Those figures were made up as follows: The 10s. 1½d. was made up of the following items: Labour in and about the mines, 6s. 4d.; timber and stores, 1s.; other costs, 11d.; royalties, 5½d.; owner's profits, 1s. 5d. That was for 1913. The corresponding figures to-day were: Labour, 19s. 5½d. as against 6s. 4d.; timber and stores 3s. 2½d.; other costs, 1s. 2½d.; royalties, 6¾d.; owner's profits, 1s. 2d.; compensation to owners for working, under the instructions of the Controller of Mines, mines which would not otherwise be worked, 3¼d.; and there was another penny required for administrative purposes in connection with coal, control, and the 1¼d. which we had as a surplus on the price. Now, taking the same things corresponding with per ton sold, because it was rather instructive to get these figures, the price in 1913 was 11s. Labour in that year was 6s. 10½d.; timber and stores, 1s. 1d.; other costs, 1s.; royalties, 6d.; owners' profit, 1s. 6½d. After July 16 the following would be the state of affairs: Labour per ton, 21s. 10¾d.; timber and stores, 3s. 7d.; other costs, 1s. 4¼d.; royalties 7½d.; owners' profits, 1s. 3½d.; compensation as before. It would be observed, then, that the increase of wages and reduction of output had resulted in two things—labour costs had increased by 13s. 1½d. per ton raised, or 15s. per ton sold out of the total increase of 15s. 11d. per ton raised, or 18s. 3d. per ton sold. This included nothing but labour in and about the mines, actual labour associated with getting the coal. The figures were taken from the evidence given to the Sankey Commission by the Coal Mines Department. They were sifted by the Commission, and the actual figures were those for the September quarter of last year. To those figures had been added the necessary amounts to cover such increases as those resulting from the application of the Sankey wage and the increased cost resulting from the return of men to the mines, who, although back, were not sharing to the same extent as those who were there before in output. The other costs, timber stores, etc., were adjusted to the actual cost at the present time.

Tracing the Cost to the Consumer

Tracing the cost of coal through actually to the coal seller and consumer in London, and taking 29s. 3d. as the cost actually paid for the coal at the pit mouth, he found that the coal should be sold in London, and was sold in London, for 49s. 6d.; 20s. 3d. marked the increase on the cost, and that was distributed as follows: First of all, the pit price, 29s. 3d. The average railway rate to London was 6s. 4d.; wagon hire, 1s. 6d.; loaders' wages, 1s. 9d. per ton; carmen's wages, 1s. 10d. per ton; other cartage charges, 2s. 7d. per ton; loss on smalls, 7d.; sacks replacement, 5d. per ton; railway siding rents, demurrage, etc., 1d. per ton; salaries, etablishment charges, and the various administrative costs in connection with the offices of the factors and retailers, 3s. 6d. per ton; and the profit distributed between the factor, which amounted to 4d. per ton, and the actual small retailer, or between two, or perhaps even three factors and the last man, 1s. 8d. per ton on the average. In 1913, for this particular coal, best Derbys, the pit price was 13s. and the London price 27s. The railway rate was exactly the same as to-day, 6s. 4d. per ton; wagon hire was 1s. against 1s. 6d. at present; loaders' wages 11½d. against 1s. 9d.; carmen's wages 10½d., against 1s. 10d.; other cartage charges 1s. 0¼d., against 2s. 7d.; loss on small. 4d. against 7d.; sacks, 1½d. against 5d.; railway siding rents, demurrage, etc., exactly the same, 1d.; salaries, establishment charges, 2s. 4d. against 3s. 6d.; and the profit 10¾d., against 1s. 8d. That profit, of course, excluded the 1s. 2d. fixed profit allowed to the coal owner. In the last group of figures, the price delivered to the consumer, there was as yet no allowance for any increase in carriage resulting from the various increases of costs by which the railways were faced, of which one, of course, was the increased price of coal. The present price of delivery in London, or in any town or port in Great Britain, was a subsidised price—the Government was subsidising the delivery. Moreover, the actual cost getting was subsidised still, and would continue to be, by the foreigner, because they were carrying into those figures still the subsidy derived from the export profits, and that subsidy was falling in amount day by day. If it disappeared altogether, the price of coal would be up another 1s. 4d. at once.

Everything Dearer.

Following from the increased cost of coal, we had at the present moment to face a rise in the price of our pig iron of anything from 15s. to 20s. a ton, perhaps more; in steel and finished iron, an increase of 25s. to 30s., perhaps more. Coke would be up 10s. a ton; spelter, £2 a ton; gas, 6d. to 9d. per 1,000 ft.; electric power, 0.2d. per unit; paper, 10s. a ton; glass, 5 per cent to 10 per cent; textiles about 4 per cent; bricks, about 5 per cent.; machinery, about 12 per cent.; chemicals generally, about 10 per cent.; some of them, such as caustic soda, sodium sulphide, and bleaching powder, from 20s. 30s. and 50s. a ton. This question of the increase of price in coal was of the most grave and serious nature for the whole nation. Not only were we losing our subsidy from export coal, but we were going to lose our national earnings from exports. Rails in Britain before the rise in coal cost £16 a ton; after the rise £17 10s. a ton; and in the United States

to-day £10 a ton; ship plates, £17 15s. a ton before the rise in coal; £19, the probable new price; American price, £14; crown bars, £21 a ton before the rise in coal; £22 10s., probable new price; American price, £11 15s.; pig iron, Cleveland No. 3 foundry, before the rise, £8; after it, £9; and No. 2 Pittsburg, £6. These figures must make everyone realize how grave was the crisis with which we were faced, because we lived by nothing else than our exports, and our export trade was gravely threatened by this position which has arisen.

The Key Figure.

The White Paper showed some of the figures on which the decision to raise the price of coal was fixed. Obviously the key figure was the output of coal during the coming 12 months. The only way to determine what that figure would be was to base the estimate on experience of actual output, either for 20 weeks of this year (as in the White Paper) or 26 weeks of this year, or a selected recent period. There was a good deal to be said for each of those bases. If factors determining the possible output of coal were all confined to the coal industry, and strictly limited to it, it might be possible to say, "Well, by goodwill, by the same sort of patriotic leadership of the miners which they got from their leaders during the war, they could get the output up at once." No amount of work on the part of the miners could get the output of coal up to the figures we wanted, although they could get it up a long way, until we had got all the other things right. So that we were absolutely bound to look at the factors which surrounded the coal industry in deciding what estimate to take. On the basis of the 20 weeks of the early part of the year, the estimate would be 217 million odd tons; or on the first 26 weeks of the year, 216 million tons; whilst for a selected four weeks, when all these factors were concentrated upon the output of coal, the estimated output was 214 million tons. The estimates involved one factor which had been followed from the Sankey Report, viz., whilst the actual hours were being reduced by 12½ per cent., the reduction of output was only taken as 10 per cent.; but with the factors outside the coal industry operating upon it, he was not sure that that 10 per cent. only might not be rather optimistic. With those estimates they had taken the 217 million tons figure to work on, which showed a deficit of £46,600,000 upon the working for the coming year. Those figures were handed in to the Coal Commission, and had been before the public, for weeks, but there had been no serious criticism of them. That £46,600,000 was 4s. 3d. per ton on all the coal raised, but it was related to a tonnage of 161 millions, which would be affected by the increase because there was the coal used in the collieries—18 million tons—on which it was no use putting 6s. a ton even for book-keeping purposes. There was also the miners' coal, which was part of the miners' wages; and then there was the coal for export and bunkers sold at open market price above the minimum, viz., 32 million tons of coal which were already earning more for us than they would earn if the 6s. were put on.

Cost of Coal Control.

In addition to that there was the cost of the coal control, at present 0.7d. per ton; but in view of all the new circumstances and new difficulties, another 0.3d. per ton must be allowed for coal control, which would make the future cost 1d. per ton, which would make miners, not on any Report, but by working."

5s. 10½d. as the absolute necessary increase to get a balance. To that they had added 1½d. in order to give a slight margin according to that estimate. Another estimate was got at in a different way: worked out from the actual subsidised cost—subsidised by ex- to obtain from the figures actually in possession of the Coal Control, and which were given to the Sankey Commission. Taking the 216 million tons basis, and port trade—at the pit mouth, a relatively easy thing knocking off the 18 million tons used in the collieries and the six million tons for miners' cottages—from which, by the way, there was derived a revenue of almost exactly £1,200,000— there remained 192 million tons for commercial disposal. The subsidised cost of raising this 192 million tons was £281,250,000. Knocking off the £1,200,000, left £280,000,000. Domestic and industrial use absorbed 157 million tons. The present average pithead price obtained for the coal was 22s. per ton, equal to £172,700,000—leaving a balance of £107,350,000 to be obtained from the sale of coal for export and bunkers. For these purposes and on this basis there would be only 35 million tons available. At present the prices for this export and bunker coals ranged from 15s. per ton for the poorest quality, small broken dross, up to 90s. per ton. Last year's average was 29s., at present the average price was 39s., but unfortunately our diminished exportable quantity was having the effect that the average composition of our export and bunker mass was deteriorating. Trade returns for June 1917 showed that the small coal exported amounted to 535,000 tons, a ratio of roughly 1 to 4. This year we exported 724,000 tons of small, and only 1,500,000 odd tons of large, a ratio of 1 to 2, so that the average price that we were getting for out export coal was falling because the quality of the composition of the mass of the coal was less good than before; and as the amount of coal we had to export declined, the composition got worse. So they were estimatin for a price of 35s. for our export on the average, as against 29s. last year, and 39s. at the moment. That meant that we might expect to receive £61,250,000 for our export and bunker coal. When that had been deducted from the £107,000,000 which ought to have been paid for by export, we were left with a deficit of £46,100,000. This deficit, according to this method of calculation, had to be spread over 157 million tons, and it worked out at 5s. 10½d. per ton, which, with 1d. per ton for coal control, gave 5s. 11½d. These two different methods checked each other, and both pointed to the 6s. increase in the price of coal if the country was prepared to go on subsidising its domestic coal out of the profits of its exported coal.

Foreign Competition

It was rather dangerous to imagine that during the coming year we were going to have a great deal of coal to export at a good price, because competition was getting very keen. American coal f.o.b. Atlantic ports was almost exactly 20s. and America was nearer some of the places to which we sent coal than ourselves. Another competitor was oil. On the West Coast of South America the shortage of patent fuel coal had the effect of establishing oil in the market. During the war the American oil companies made contracts for three years with various consumers who used to be patent fuel coal at 10s. per ton delivered, and now the three years' period has terminated the American oil companies had intimated that they were prepared to contract for one year for 70s. per ton of

oil, which was worth two tons of coal calories. That was some of the competition we had to face, and also the fact that the Americans were now offering long term contracts, and if we had also to offer long term contracts our profits must be further reduced because the price would have to be lowered. So one could only say that, though we were estimating on a 6s. per ton rise for coal, we were doing it knowing that we were taking a very considerable risk in having underestimated the amount that we ought to put on, because the 6s. was arrived at after allowing full credit for about 1s. 4d. subsidy derived from our export trade.

The secretary of the Miners' Federation of Great Britain had issued a statement to the Press to the effect that the Coal Controller on June 3 estimated the output for the year 1919 at 230,606,000 tons, and the deficiency for the year ending December 1919, after providing the owners with a guarantee profit of 14 millions, at £36,900,000, and that this sum, spread over 230,606,000 tons output, equalled 3s. 2.4d. perton, whereas Sir A. Geddes would increase the price to the consumer by 6s. per ton, even when advised that the arithmetical deficit was only 3s. 2.4. Now, no part of that deficit of £36,900,000 so far had been raised from the price of coal; it had been met from the taxpayer or borrowed money. If we were to pay the whole of that £36,900,000 of this year, the increase in the price of inland coal on the remaining part of the year would have to be 9s. 2d. per ton. Another point which had been made strongly was that in the past there was an increase—described as a useless or unnecessary increase—in the price of coal of 2s. 6d., as a result of which the Government has been alleged to have made a large profit out of the coal industry. That transaction had not been fully understood. In the spring of 1918 it was ascertained that the Coal Mines Agreement Act was being worked at a loss, and the accounts up to March of 1918 showed a deficit at the rate of six millions per annum. In order to make the agreement self-supporting it was necessary to impose a charge of 2s. 6d. in June 1918. It had been said that the Government was profiteeing out of the people of the country. Nothing of the sort; it was preventing international profiteering. The profits that were made out of the 2s. 6d. rise at that time were profits made from overseas. For example, we had during the war to get large quantities of goods from neutral countries for which high prices were asked, and in fact we got those goods by bartering coal, the only way that we could keep the price of those things which we were buying anything like reasonable was by charging, in the arrangements for barter, a larger sum for the coal. That was the source of the so-called profits. They were not profits in a sense, but they were going against what the Government was paying for stores in the war. These sums of money only passed as a matter of book-keeping through the coal industry, and on the international basis that money was absolutely required to meet our war charges accruing overseas. The actual arrangement, so far as the industry at home was concerned, was that after the half-crown was on there was 1s. 6½d. profit per ton of coal available for the mine owners in this country. The mass of money which passed through the coal industry—it was not taken from the coal industry, but passed through—at that time was altogether coming from outside the country, and was part of the general adjustments in connection with international bargain. These possibilities of so-called profits no longer existed. We had not got the coal to export. Our ships would have to go out in ballast if they were to come back bringing iron ore, or whatever it might be in the way of raw material. If we had not exports to send out—and we should have few if coal, iron, and finished iron and steel were dear—the exchanges must go more against us, and we must be placed in a position of having to pay more for all our food. He would urge that the present was no time for any section of the community, or for the Government to think that its interests were separate from the interests of the whole lot. To get through the dark and anxious days which lay ahead we must get back to the spirit which we had during the war. It was no good anybody saying that anybody else especially was to blame, excepting on one thing, and there the blame was heavy if it could be proved in any way whatever. The men who were to blame at the present time were those who were not doing their best to get production, to get output, to get the cost of production down, by increasing its bulk.

Appeal to Miners' Leaders.

That at the present moment was the most urgent need of every department of our national life, and that was the point upon, which the miners, the actual workers in the mines, could do more to help the country than in any other way to get ahead, and whatever the other difficulties outside the industry might be, or of getting the coal away from the mines, let us see that the maximum amount of coal was got out of the mines that could be got. He would ask the leaders of the miners to go down to the men they know so well and say to them: "This is no time for doing less than the maximum you can do." He would ask the leaders of the other section of the community to say the same thing to their people; but, because coal was the basis and principal source of our power, its shortage, its dearness, affected us more than the shortage or dearness of any other thing except bread. Therefore he would ask every man who had influence with the miners, if they saw, as they must see, and know that many of the men who had the chance were not working, and many who had a limited chance were not working to the limit of their chance. If they would work to the limit of their capacity, then he had little fear that it could be possible for them soon to say: "The output is rising so well that we may run the risk of bringing down the price of coal." If the output went up, they would be only too glad and willing to meet the rising output by a fall in the price of coal. If the output could be got up, he thought he might say on behalf of the Gevernment that as the output rose they would only be too glad to get the price of coal down 6d. a time, or some small amount, in order once again to get our industry freed and our export cheap. But unless we got coal, and unless everybody really would do all he could to get the output, and unless men of other industries would do all they could to free the circulation of goods in the country, to get up the supply of things required for the miners, there would be great difficulty. The key of the position, the final key, rested with the miners' not on any report, but by working.

Mr. Robert Bryce, of Toronto, is leaving for British Columbia. He will be away for about three weeks.

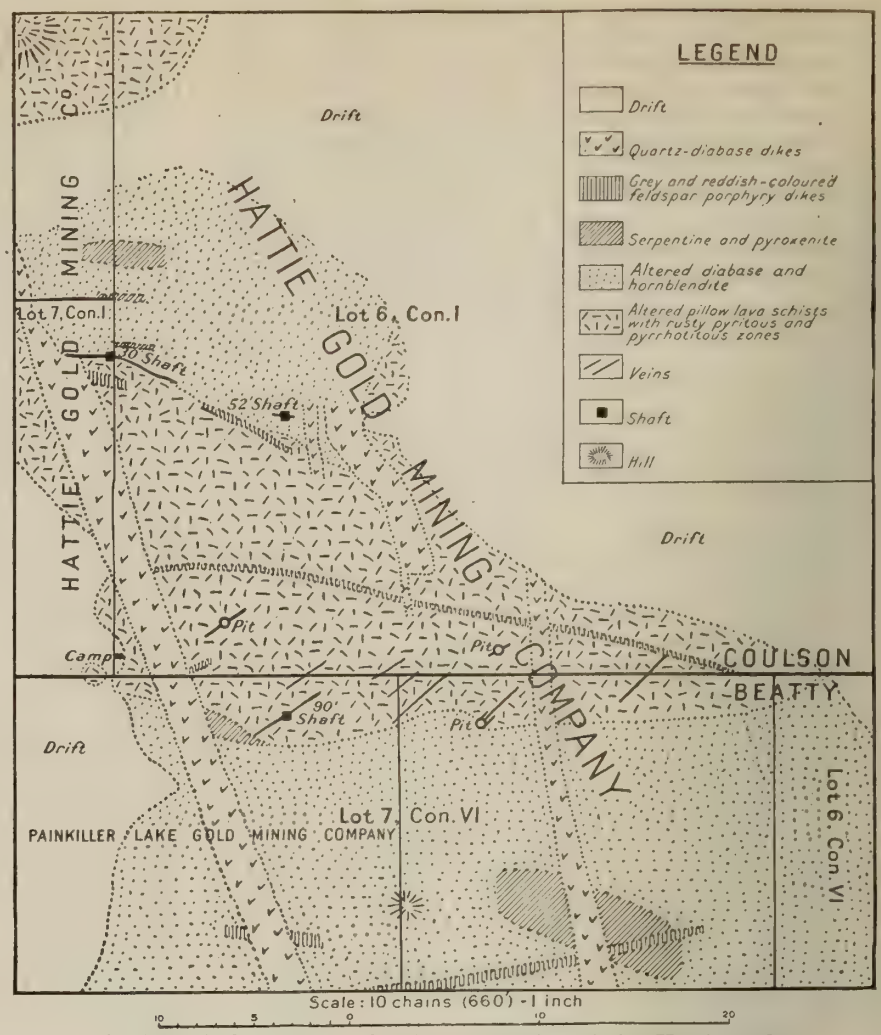
GEOLOGY OF PAINKILLER LAKE AREA

A part of the Painkiller Lake area has been mapped in detail by the geologists of the Ontario Bureau of Mines. The accompanying sketch map from a report just published shows the properties of the Hattie and Painkiller Lake gold mining companies and will be of use as a key map for adjoining properties.

The veins occur in altered volcanic rocks. The numerous narrow gold-telluride-quartz veins in the area are practically all parallel, striking north-east. "The veins, which are usually about one inch in width, are not always closely spaced, and the intervening area contains few or no cross fissures.

The minerals are gold, tellurides, pyrite, chalcopyrite, pyrrhotite, galena, zinc-blende, quartz, chlorite, sericite and calcite. Large east and west veins of mispickel, pyrite and quartz carrying low values in gold represent another type of vein."

The Painkiller lake area is in Coulsin and Beatty townships, Temiskaming, Ontario. The lake is about ten miles northeast of Matheson, a town of the Ontario Government railway.



Geological sketch may showing properties of the Hattie and Painkiller Lake gold mining companies, townships of Coulson and Beatty.—Bureau of Mines.

DR. COOKE'S REPORT ON DAVIDSON PROPERTY MATACHEWAN AREA.

(A Correction.)

In our July 16th number we published a resume of an article by H. C. Cooke on the Matachewan Gold Area. Unfortunately some paragraphs were omitted and the description of the Matachewan Gold Mines property came under a heading intended for the description of the Davidson property. The sketch maps which accompanied the article and the introductory paragraphs made it obvious that the property being described was the Otisse; but some newspapers reproduced the article without the maps and introductory paragraphs and consequently the incorrect heading was then more misleading. Dr. Cooke said of the Davidson deposit in part:

"On the Davidson claim the ore body is a portion of the porphyry itself. The porphyry is cut by a multitude of veinlets of auriferous quartz mostly less than one quarter inch in thickness, and spaced at intervals of approximately a foot. The porphyry has thus the character of a stockwork, although the veins in the main are not reticulating, but possess a subparallel arrangement evidently the result of jointing according to a definite system. Such jointing and enrichment has taken place mainly in the coarser-grained, more slowly crystallized phases, located, in general, toward the centre of the intrustive. Where the grain is finer, jointing and enrichment has not occurred. The hypothesis advanced by Spurr, that the last portions of a magma to crystallize are rich in water, and hence must contract considerably on cooling with formation of joint cracks, may be the explanation of this phenomenon.

"Channel samples taken along the bottoms of trenches in the enriched areas by the engineers examining the property are said to have yielded values varying from $5 to $25 per ton.

"The gold appears to be chiefly present as the native metal, although it is difficult to tell whether this was its original form, as development has not gone below the oxidized zone. However the lack of limonite around many of the grains of gold would indicate that it is not residual from the oxidation of pyrite. Whether the pyrite also is auriferous has not yet been established. The gold is found principally in the narrow veins of quartz that intersect the porphyry, but grains of gold have been occasionably found within the porphyry itself, although never more than a few inches from a veinlet."

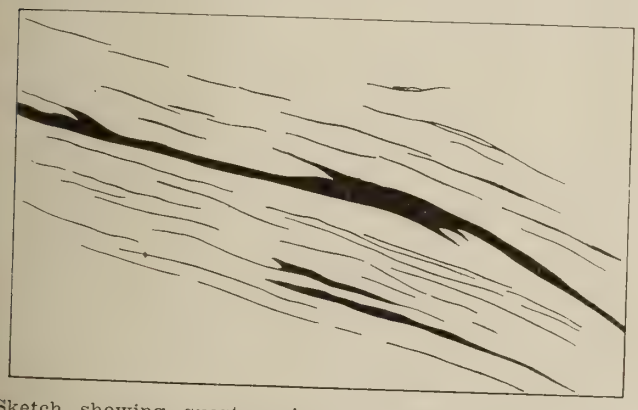
THE HOWEY-COCHENOUR-WILLANS GOLD DEPOSIT

In the recently issued report on the Lightning River area the geologists of the Ontario Bureau of Mines describe the deposit on the Howey-Cochenour-Willans property on which some work has been done. The accompanying sketch, taken from the report shows the lode structure at a depth of 35 feet. There is a "main persistent quartz vein, varying in width from an inch to 10 or 12 inches, with an average width of about 4 inches. Roughly paralleling this main vein there are a number of narrow veinlets, usually less than an inch in width, and more or less discontinuous, the whole partaking of the character of a sheeted zone produced by shearing that accompanied the formation of the fault. This zone varies in width from 2 to 3 feet." The quartz vein is in basalt at the westerly exposure and in rhyolite at the eastern. The shaft following down the vein dip of 23° was started in basalt and entered rhyolite at about 50 feet. Information furnished by J. W. Morrison, who was in charge of operations, indicates that the deposit lies along a fault of the thrust type.

"The quartz for the greater part is of a milk white color and, where not fractured by secondary movement, is rather coarse grained and characteristic of primary quartz in veins. Where the primary quartz has been granulated, usually in a direction roughly parallel with the walls, there is an abundance of secondary calcite with pyrite and a small amount of chlorite. Some pale colored zinc blende and galena are also present."

"The gold usually occurs in a fine condition with the pyrite, but samples from the main vein often contain gold in the quartz visible to the eye."

"Near the veins the wall rock, which is a basic lava, has been greatly altered by circulating waters to carbonate and chlorite, and is penetrated by veinlets of quartz, calcite and chlorite."



Sketch showing quartz veins at Howey-Cochenour-Willans gold prospect, Holloway township; east walls at depth of 35 feet in shaft. The length of vein system in sketch is about six feet. The main quartz vein is shown by the heavy black part; parallel stringers of quartz occur on each side of the main vein.—Bureau of Mines.

Mr. J. E. Spurr has been appointed editor of the "Engineering & Mining Journal," New York. Mr. Spurr is a geologist who has been notably successful in applying geology to mining. Recently he has been in charge of Mineral Investigations of the U. S. Bureau of Mines, a special staff having been engaged on this work for war purposes.

THE MACKENZIE RIVER BASIN

A map and report that will be very useful to those who explore the Mackenzie River Basin in Northwestern Canada has been prepared by Charles Camsell and Wyatt Malcolm and published by the Geological Survey of Canada. Mr. Camsell has had much field experience in this large area and those who explore it will do well to provide themselves with copies of the report.

As the area of the Mackenzie basin is about 682,000 square miles and the greater part of it practically unexplored, it would be a tremendous task to prepare a geological map of the basin. The purpose of the present compilation is to give a concise statement of the present knowledge of its economic possibilities, particular attention being given to the geological features and possible mineral resources.

The area shown on the map extends from Edmonton, Alberta, north to the Arctic and from Prince Albert, Saskatchewan, west to the Pacific Ocean. It includes large portions of the provinces of Saskatchewan, Alberta and British Columbia and of Yukon and the Northwest Territories. The known waterways are mapped and along the chief waterways the geological formations are mapped. Prospectors will find much to interest them in the map and the accompanying report.

Bituminous Sands.

On the Athabasca river there is exposed an immense body of bituminous sands. In the report some of these beds are described in detail. The results of the investigations made by S. C. Ells are summarized. Mr. Ells is of the opinion that the sands can be successfully used as a basis for satisfactory asphaltic pavements.

Clays.

Some of the clays along the Athabasca have been studied. In the report a summary of the results of tests is given.

Coal.

Coal is being mined in the Crataceous rocks along the Canadian National railway which crossed the southern part of the area mapped. In this report attention is directed to the more remote and less known seams, which lie further north. Coal seams on the Smoky River in the Kootenay formation are high grade bituminous "and at least one seam on Smoky river may be classed as anthracite."

A large number of thin seams are exposed in the canyon a few miles above Hudson Hope. Small seams occur also in Peace River canyon and on Getling Creek. On Johnson creek twenty seams are exposed, but only four exceed 2 feet in thickness.

Lignite coal is seen at a number of places in the banks of the Athabasca for 62 miles above Fort Assiniboine. Coal occurs also on McLeod river and near Wolf creek. A number of other occurrences of coal in the area are mentioned in the report.

Gypsum

"Gypsum is exposed at many points in the Mackenzie basin. The deposits that are most likely to prove of commercial interest are those occurring on Peace river and in the escarpment to the west of Slave river."

Petroleum and Natural Gas

"Boring operations have been conducted along Athabasca and Peace rivers where strong flows of gas were struck in two or three wells, and petroleum bearing strata on Peace river have been penetrated.

Oil and gas indications are found in the sediments of Cretaceous and Devonian age, both of which are of wide distribution."

It is stated that "the possibilities of the Devonian sediments as a source of petroleum are worthy of consideration." From the point of view of the prospector the McMurray sandstone is so far as present knowledge goes the most important formation of Cretaceous age, in the Mackenzie basin." The writers summarized that little is known of the structure of the Cretaceous formations.

The report on petroleum possibilities is particularly interesting at this time because of the unusual activity in geological exploration for oil this summer. Areas as far north as Great Slave Lake are being carefully examined and drilled.

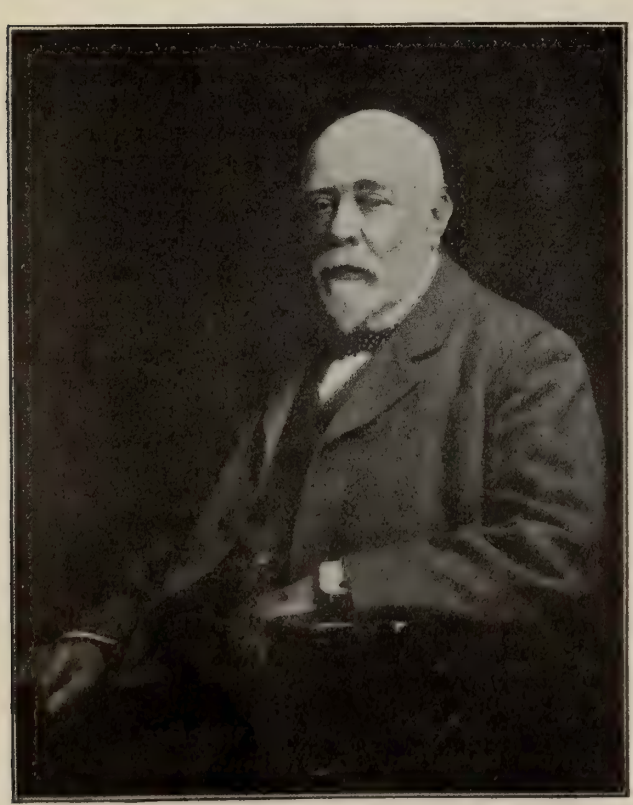
Salt

"Numerous brine springs are found in the Mackenzie basin, from some of which is obtained for local consumption." Several analyses of brine are given in the report.

Pre-Cambrian Areas

It will be noted that most of the known important mineral deposits in the basin are non-metallics. There are however Pre-Cambrian areas concerning which little is yet known. In the central and western part of the area mapped the younger formations predominate, but in the eastern third of the basin there are rocks such as enclose most of the metalliferous deposits of Ontario and the Lake Superior states. —R.E.H.

"It's a hard come down," says Walter Pulitzer, "that the country that produced William of Orange should have to continue to harbor William the Lemon." —New York Evening Mail.



GEORGE BLAKE WALKER, M. Inst. C. E., President of the Institution of Mining Engineers. 1918-1919.

LABOR AND SCIENTIFIC RESEARCH.

The American Federation of Labor adopted the following resolution at its Atlantic City convention:

"WHEREAS, scientific research and the technical application of results of research form a fundamental basis upon which the development of our industries, manufacturing, agriculture, mining, and others must rest; and

WHEREAS, the productivity of industry is greatly increased by the technical application of the results of scientific research in physics, chemistry, biology, and geology, in engineering and agriculture, and related sciences; and the health and well-being not only of the workers but of the whole population as well, are dependent upon advances in medicine and sanitation; so that the value of scientific advancement to the welfare of the nation is many times greater than the cost of the necessary research; and

WHEREAS, the increased productivity of industry resulting from scientific research is a most potent factor in the ever-increasing struggle of the workers to raise their standards of living, and the importance of this factor must steadily increase since there is a limit beyond which the average standard of living of the whole population cannot progress by the usual methods of readjustment, which limit can only be raised by research and the utilization of the results of research in industry; and

WHEREAS, there are numerous important and pressing problems of administration and regulation now faced by federal state, and local governments, the wise solution of which depends upon scientific and technical research; and

WHEREAS, the war has brought home to all the nations engaged in it the overwhelming importance of science and technology to national welfare, whether in war or in peace, and not only is private initiative attempting to organize far-reaching research in these fields on a national scale, but in several countries governmental participation and support of such undertakings are already active; therefore be it

RESOLVED, by the American Federation of Labor in convention assembled, that a broad program of scientific and technical research is of major importance to the national welfare and should be fostered in every way by the Federal Government, and that the activities of the Government itself in such research should be adequately and generously supported in order that the work may be greatly strengthened and extended; and the Secretary of the Federation is instructed to transmit copies of this resolution to the President of the United States, to the President pro tempore of the Senate, and to the Speaker of the House of Representatives.—Bulletin A. I. M. M. E.

PERSONALS.

Mr. R. E. Hore is examining mining claims in Churchill township, Sudbury mining division.

Lieut. H. K. Boysen, who went overseas with the R.A.F., and Miss Lorena Ferguson, of Haileybury, were married recently. They are spending their honeymoon at Barre, Mass. Lieut. Boysen was for some time on the staff of the Tough-Oakes mining company. He came to Toronto to learn how to fly, and soon became a capable aviator. He served on many battlefields. He says he will now give up aviation entirely and devote his attention to the mining business.

Special Correspondence

BRITISH COLUMBIA.

British Columbia Coal Production in June.

While the output of the coal mines of British Columbia for the month of June was not altogether satisfactory, it is gratifying to note that the Cassidy Collieries, Granby Consolidated Mining and Smelting Company, Vancouver Island, materially increased its output. The mines of the Crows Nest Pass of course made no production because of the strike, which has been in progress there for some time. It is expected that the Island coal mines will increase their output with the return to five full working days a week. The mines of the Western Canadian Fuel Company, The Canadian Collieries (Dunsmuir) Limited, and the Nanoose Collieries, have of late been working on what is known as slack time, about three days a week, but recently this has been extended.

The output for June in detail follows:

Vancouver Island Coal Production, June, 1919.

	Tons.
Western Fuel Company, Nanaimo Colliery ..	36,747
Canadian Collieries, Comox Colliery	35,357
Canadian Collieries, Extension Colliery	15,157
Canadian Collieries, South Wellington Coll.	5,124
Pacific Coast Coal Mines, Morden Colliery..	5,516
British Columbia C. M. C., East Wellington (Jinglepot)	3,420
Nanoose Collieries	1,412
Granby C. M. S. & P. Co., Cassidy	10,572
	113,305
Nicola-Princeton District.	
Middlesboro Collieries	6.091
Fleming Coal Company	2,963
Merritt Colliery	266
Coalmont	1,400
Princeton Colliery	1,184
	11,904
Northern District.	
Telkwa Colliery	158
Crow's Nest Pass District.	
Nil	....
Total	125,367

Victoria, B.C.

Privy Council Decide Foreshore Coal is Property of Province.

The Privy Council has upheld the judgment of Canadian courts that the coal lying under the foreshore within the Esquimault and Nanaimo Railway belt is the property of the province. The E. & N. Railway Company, it will be recalled, laid claim not only to all the coal within the railway belt proper, but all that might be found under foreshore lands. Their title was contested by H. W. Treat of Seattle, Washington, who has staked some foreshore near Chemainus and was proceeding under Provincial license to do some boring with the intention of developing the coal should it prove to be in sufficient quantity. When the Railway Company questioned his right and took the matter to the Court Mr. Treat was successful. The case, however, was appealed, but now with the Privy Council on record there is no further question of the validity of his claim.

Following the publictation of this result mining men are interested in the development of the coal leases at Oyster Bay and other points in the neighborhood of Chemainus. Mr. Treat is reported to have run through coal at Chemainus in two drilling positions. It has been established that there are large coal beds in this section, but whether they are available for commercial development remains to be established. It is understood that Mr. Treat and his associates propose to continue with their work, being confident that this foreshore coal can be mined at a profit.

Anyox, B. C.

When the Honorable William Sloan, Minister of Mines for British Columbia, was at Anyox recently, he was particularly interested in the new by-product coking ovens recently installed by the Granby Consolidated Mining Smelting and Power Company and the operation of which commenced some weeks ago. He said that the coal from the Cassidy Collieries, Vancouver Island, was producing the desired quality of coke and that while facilities for utilization of all by-products were not yet available, pipes were being laid which would permit the use of the gas and result in a considerable saving of fuel. The coal tar is being stored and will be marketed at various Northwest points for use in the manufacture of creosote. The benzol plant is fast being completed and will be the most up-to-date of its kind on the Pacific Coast. There are seventeen other by-products to be manufactured including ammonia, tri-nitro-toluol, toluol and dyes. Thirty ovens, each with a capacity of more than ten tons, are now making coke.

Fernie, B. C.

The situation developing as a result of the strike of coal miners in District 18, U.M.W. of A. (Eastern British Columbia and the Province of Alberta) has reached a stage of open conflict between the International Union and the One Big Union. It would appear that the men in the Crows Nest Pass field at least are willing to return to work and are anxious that an agreement should be negotiated with the mine owners. The latter, however, take a strong position against the One Big Union. They state that they are willing to come to a settlement with the men through the United Mine Workers of America but will have no "truck or trade" with the O.B.U.

That it is open war between these two organizations now is quite clear and it would seem that the men will be forced to make a choice. Recently the charter of District 18 of the United Mine Workers of America was revoked, an official statement to that effect being made from Calgary by International representatives Samuel Ballantyne, Samuel Caddy and William Dalrymple. This has put eight thousand miners who have been on strike in Alberta and British Columbia since May 24th outside the pale of the International Union. The International representatives mentioned wired the result of their inquiries into the Western Canadian situation to John L. Lewis, International President of the U.M.W. of A., as follows:

"Completed investigation today find District President is member of dual organization. Showed Committee his membership card (O.B.U.) Vice-President and Secretary Treasurer also lined up in favor of dual organization. We would advise that District charter be suspended at once. Awaiting early reply.".

In reply to this telegram the following wire was received from the International President:

"Message received. Wired H. M. Christopher (President of District 18 U.M.W. of A. today as follows: "As you are aware the International Executive Board directed Messrs. Ballantyne, Dalrymple and Caddy to conduct an investigation into the existing affairs in District 18 of the United Mine Workers of America and make recommendations to the international offices as to the matters of policy to be pursued in that District. This Committee has been pursuing its investigations and I am today in receipt of its recommendations that the charter of District 18 be revoked for good and sufficient cause. Accordingly I am hereby officially informing you that effective this date the charter of District 18 stands revoked and the District as such ceases its affiliation with the United Mine Workers of America."

As illustrating that there is a distinct difference of opinion as to the wisest course to pursue among the miners of the affected district, it may be noted that at Fernie on July 10th a meeting of the Fernie Miner's Union declared by a large majority in favor of negotiating a new working agreement as an organization of the U.M.W. of A., while from Calgary under date of August 2nd comes a statement by Ed. Browne, late Secretary-Treasurer of District 18 U.M.W. of A., that it has been decided not to turn the books of the Union over to the International officers. The latter, of course, made this request following the suspension of District 18, already referred to. Mr. Browne explained that this decision had been arrived at after a meeting of the Policy Committee, an executive board of the miners, who have constituted themselves into "No. 1 Mining Department of the One Big Union." Of this P. M. Christopher is the President; Alexander McFegan, Vice-President, and Ed. Browne Secretary-Treasurer. These officers to remain in office until the first constituted convention is called. "We are organizing the different locals under this heading" Mr. Browne observes, "and are now opened to do business. We have wired to Coal Commissioner Armstrong informing him of this and stating that we are prepared to negotiate for a settlement of the present strike, and also telling him that if this is not done he will be the man responsible. Any contract that we make will be fulfilled, and as for turning over any documents or anything else to the International representatives we wont do anything of the sort, and they will have to fight us all the way for their possession."

Broadly speaking, the situation is that many, in fact almost certainly the majority of the miners want to go back to work but are not likely to have that privilege at an early date unless something unexpected occurs tending towards the settlement of the present very sharply drawn issue between the U.M.W. of A. and the O.B.U.

Victoria, B. C.

T. H. Williams,who has been mine inspector at Fernie B. C. has retired and A. Strachan, inspector at Merritt, B.C., has moved to Fernie. D. McLean has been appointed inspector at Merritt. This is a new appointment. Mr. McLean is a returned soldier. He conducted a mining school at Ladysmith, B.C., before going to the front and on his return managed for a few months one of the mines of the Nicola-Princeton coal field. Messrs. Henry Miard of Fernie and James Dixon, late Manager of the Reserve Mine, Nanaimo, who recently was appointed to the British Columbia Board of Examiners, have been appointed also acting inspectors.

Ottawa, Ont.

As a result of the investigation held by the select committee of the Senate of Canada appointed recently to inquire into the question of certain valuable coal leases in the Smokey River district of the Alberta Peace River, about two hundred miles north of Edmonton, the leases have been cancelled by Order of Hon. Arthur Meighen, Minister of the Interior. As a consequence the application for the right to build a railway to be known as the Athabasca Grande Prairie and Vermillion Railway, will go no farther in its present stage. In the investigations that took place officials of the Geological Survey Branch, Ottawa, testified that the coal area in question probably is the richest in Canada and that if developed and connected with the main line to the south it would be able to supply the whole of the West with a coal almost equal in quality to the Pennsylvania anthracite. That this may come about it is recommended that the Government develop the area either on a National or royalty basis and that a line of railways sixty miles in length be constructed at once from the Grand Trunk Pacific or Canadian National Railways' main line to the area in question. The leases comprise some eighteen thousand acres, and the coal available is estimated at from 200,000,000 to 400,000,000 tons. A German-American, Dr. Botts, first filed on the leases in 1912, and paid into the Treasury the sum of $100,000 in six years for his leases. In 1918 he failed to make payment and the rights were cancelled.

Nanaimo, B.C.

On his return from Ottawa recently, Senator Planta made some statements with reference to the efforts which had been made at the Capital to have the duty on fuel oil into Canada removed. He said that strong pressure had been brought to bear on the Government to this end. Petitions having been forwarded with the support of the Vancouver Board of Trade and other Vancouver organizations. The reason advanced for the move being to force down the price of coal. Senator Planta thought that it was the big interests who were behind the movement and he referred in this connection to the C.P.R., the Canadian Pacific Steamship Company and the Manufacturers Association. The Minister of Finance it is stated, had been strongly impressed with the advisability of taking this action but it was so strongly opposed by representatives of the coal mining constituencies that no action was taken.

The Vancouver Island Mine Safety Association will hold its annual contest in first aid and mine rescue work on September 1st next at Nanaimo, B.C. Seven or eight teams are entered representing the various mines of the Nanaimo district and there will be teams from coal producing sections of the mainland as far east as the Crows Nest Pass. The Provincial Government has made a substantial grant this year to assist the Association in providing an attractive programme and interest is high among those who will compete. They have been in training for months and it is expected that the meet will be the most successful held in the Province for four or five years.

Vancouver, B.C.

Two problems are receiving attention at the hands of consumers of coal in the Northwest at the present time. One of these is the likelihood of there being a shortage next winter and the other the rapidly advancing prices.

Coal merchants of Victoria and Vancouver, B. C. state that they do not expect a condition that will prevent their meeting all demands both from domestic and commercial sources. They are looking forward, however, to the arrival of the American naval squad-

ron at Bremerton, Washington, to tax the production of coal in the Northwest to the utmost. In the meantime an advertising campaign is in progress having in view the inducement of the public to purchase their winter supply of fuel as far as possible without delay.

As to prices, there is a considerable section asking for an investigation. Coal now is bringing about $10.75 a ton as compared to $7.50 when the war broke out. Many cannot see the justification for this substantial increase and would like the matter thoroughly probed by a properly constituted government board.

Canadian Consolidated Mining and Smelting Co. Trail, B. C.

In a circular issued by management of the Canadian Consolidated Mining and Smelting Company recently, an advance of wages to employees is announced. A full statement follows: "The management have been giving serious consideration to the further advance in the cost of living, especially married men with families. In Rossland and other camps where the scale of wages increases automatically with advances in the market price of copper, the situation is taking care of itself. In the lead-zinc camps the smelter wage scales have gone up somewhat through increases in metal prices, but as these increases do not compare with the advances in copper, the situation calls for some action.

Effective for three month beginning August 1st, all employees in the lead-zinc camps and at the smelter will receive an additional bonus of twenty-five cents per shift. Existing wage agreements and sliding scales based on various prices of metals will not be affected by this bonus but will continue to be maintained.

Some of these agreements provide that there is to be no advance in boarding house rates while the wage scales set by these agreements are in effect.

In as much as the bonus now granted is in addition to these wage scales and as the advance costs of food, etc., has resulted in heavy losses in the Company's boarding houses, there will be after August 1st, an increase in board of 20 cents per day.

The operations of the Company do not justify the payment of this bonus as there is practically no production of copper and the market prices of lead and zinc are but little higher than before the war.

Employees are asked therefore to co-operate with the management by increasing efficiency, reducing waste and generally taking a personal interest in our mutual welfare."

JAMES J. WARREN,
Managing Director.

The Consolidated Mining and Smelting Company has determined to experiment in the cultivation of land adjacent to its plant at Trail, B.C. Various tracts of land in different directions from the smelter are to be put under crop. The production will be useful in the feeding of the Company's employees and besides the results will be a practical test of the claim made that the smoke from the smelter seriously damages the crops of the district. This is a complaint made by the farmers of the district who have been asking for damages from the Company from time to time. The Company while not denying that perhaps the smoke affects vegetable growth, maintains that the damage done by the smoke is not in any way as serious as alleged by the agriculturalists.

The erection of a large reduction plant at Rossland, B. C. is proposed by the Consolidated Mining and Smelting Company of Canada. The site of the proposed plant has not yet been definitely selected the Company having made a proposition to the municipal authorities of Rossland which is under consideration. If Rossland will guarantee a sufficient water supply and will protect the Company from damage suits it is likely that the installation will take place there, but should this matter not be satisfactorily arranged the John Hintz ranch purchased by the company last year is likely to be selected as the site.

Ore receipts in gross tons for the week from July 22nd to July 31st 1919, inclusive, at the Consolidated Company's Smelter, Trail, totalled 9,684 tons, making a grand total for the year thus far of 202,520 tons. The biggest shippers of course are the Company's mines, 86,755 tons of zinc ore having come from the Sullivan Mine.

A much better outlook for the disposal of the lead surplus of the Consolidated Mining and Smelting Company is indicated by the last circulars of lead shippers issued by the Company. This states that three times the quantity of lead was disposed of in June as during the preceding month.

Anyox B. C.

The Granby Consolidated Mining, Smelting and Power Company gave notice of a further increase in wages amounting to twenty-five cents per day to more than 1500 of its employees a few ways ago. This is the second advance made during the month of July. The Company's action is in line with its agreement with the employees that wages shall be based on the price of copper. If, as is predicted, copper reaches approximately twenty-six cents within the next few weeks, wages at the Granby Smelter will reach a figure almost equal to that paid when the armistice was signed.

Work at the mine and smelter is continuing in three eight-hour shifts and the camp is beginning to take on the appearance of pre-war days. When the armistice was signed there were more than sixteen million pounds of copper at the Granby properties ready for shipment, much of which was disposed of at considerably lower figures than present day prices. Steady shipments have been made recently amounting to several millions of pounds and there still are large shipments piled up on the Anyox docks that will be sent to the refineries as quickly as transportation facilities can be obtained.

The Granby Company has taken an option on the Harrison property on Chickamin Mountain between Eutsuk and White Sail Lakes.

NORTHERN ONTARIO.

Boston Creek District.

Miller-Independence.

Arrangements to proceed with the installation of a new mining plant and mill are well under way. A small steam driven outfit is being rushed to the property with the object of getting mining operations under

Miller-Independence Power House.

way before the end of this month, so as to lose no time during the installation of a larger modern electrically driven plant.

Plans for the erection of the first unit of the new reduction plant that will treat ore at the rate of 100 tons daily have been carefully laid, and, it is estimated, this amount will be going through by the end of the current year. Later on, according as tonnage should demand, the capacity of the plant can be increased.

One of the Miller-Independence Shafts, Boston Creek.

Mondeau Property.

Cross-cutting is being done at a depth of 140 feet on the Mondeau property, near the boundary between the townships of Boston and McElroy, in the Boston Creek district. A vein has been cut a short distance south from the shaft in which considerable mineralization occurs. To the north the cross-cut at the time of writing is in a highly mineralized body, portions of which contain high gold values, some of the assays running as high as $92 to the ton.

The exploration and development of the Mondeau will be continued with the present steam plant for the summer, and the results of the work will determine whether or not a larger plant will be installed during the coming winter.

Diamond Drill on Cullen-Renaud, Boston Creek.

A large cash payment is due on the O'Donald property at Boston Creek, and which is under option to the Allied Gold Mines. Whether or not the payment was made has not been learned at the time of writing. The O'Donald is considered to be one of the most important of the undeveloped mining properties in the Boston Creek district. Diamond drilling carried on during recent months has indicated the presence of commercial ore at depth. The property is under option at a price well up in six figures and it is understood the Allied Gold Mines have endeavored to have the terms modified.

The Cobalt Strike

(Reviewed by our Correspondent.)

The weight of the first real labor strike in Cobalt's history is falling with full force upon the mine workers of this camp. Pay-day arrived and past and was unaccompanied with the usual pay envelop. Not a few of the merchants have found it necessary to offer no further credit. For the first time in their lives a great many of the dependents of the mine workers have come to realize that strikes and stress keep company. Perhaps the greatest pity of all is the fact that those least able to stand the strain are compelled to bear the brunt, and further, the more loyal the subject, the greater is the burden.

A good many returned men, those who worked for $1.10 a day, (hours according to necessity and limited only to twenty-four) have openly stated that the eight-hour day and the high wages paid in the mines were very satisfactory. If the executive of the Cobalt Miners' Union had played a part in fighting for freedom which they now enjoy, declare some of the returned men, they would probably be less anxious to plunge headlong into industrial war at this time and against an industry that is already paying maximum wages and when the principle of of "recognition" is the only important question involved. The man who remained in Canada during the war, working at high wages, was able to accumulate a financial reserve. The man whe went overseas generally finds himself without any reserve fund. The former, the larger percentage of whom are foreigners, and a good many of whom are of alien enemy origin, are able to live in comfort for a time or shift to other parts of the country in search of employment. Not so with the returned men, however, who had just got nicely started to share the advantages of the high wages received since returning to civilian life.

It is a grim fact, that although the majority of the returned men of Cobalt appear to be opposed to a labor strike under present condition, yet they have been compelled to suffer defeat in a voting contest where the ballot of the Hun and the Austrian carried equal weight to their own.

The mine managers of the mines of Cobalt have always exhibited a keen desire to discuss various contentious matters with committees representative of their employes. The returned men are aware of this. They also know the reason. They know that such a procedure permits every man to voice an opinion. They that not only is the Western Federation of Miners the traditional enemy of every honorable mine manager, and that by dealing with that organization they would only hear the voice of the radical element whose every action would be in constant danger of being influenced by doctrine of a few non-working "leaders". And so, unless the executive within a reasonably short time find a pretext for at least partially rectifying the blunders of the past month, they appear to be confronted with the probability of being asked to surrender their present authority, or face collapse of the labor organization in its present form.

Summarized, the situation in Cobalt is this: Early in the current year there was little or no dissatisfaction, but signs of an unrest began to appear. In June this unrest had grown to such a pitch that a

strike vote was taken and resulted in a large majority in support of presenting demands which included recognition of the union. At no time did there appear any glaring dissatisfaction. On July 13th a meeting was held in the Union hall and the radicals were defeated at every turn. On July 14th, the writer was informed by a prominent labor man that a meeting to be held on July 20th would probably result in all action being deferred for this year at least. It is a significant fact that the meeting on July 13th was held in the absence of Jimmy McGuire who was in Ottawa keeping in touch with Senator Robertson, Minister of Labor. Before the end of the week the whole situation took an unfavorable turn. It became known that Senator Robertson had requested that the Mine Managers Association send representatives to Ottawa for a conference, that the Union were aware of this, that the Union Executive had previously written the mine managers urging them to attend and that Senator Robertson, on the refusal of the mine managers' to attend such a conference in connection with an issue that was dead, told McGuire that the Government could do no more and that the stand of the union was justified. Had Senator Robertson not invited the mine managers to a conference which he surely felt convinced that they would not desire to attend, things might have gone differently in Cobalt. As it was, McGuire returned from Ottawa, attended the meeting of July 20th, told the 500 or 600 men gathered there that the mine managers had defied constituted authority by not going to Ottawa, that the Minister of Labor had declared that the stand of the Union was justified, that the mine managers were to blame and that a strike was all that was necessary to win that which the Union was demanding. He asked all those in favor of a declaration of a strike to take effect July 23rd. to rise. The vote was almost unanimous. Thus, on the very day which prominent and cool-thinking labor men had the week before expected would result in deferring action for another year, actually saw the industrial situation in Cobalt completely upset.

The Minister of Labor has denied charges that he told McGuire to call a strike. The Minister, however, has not denied that he failed to use his influence to prevent the union from calling a strike. He actually stated that the government had done all that it could be arranged for a settlement and that the stand of the union was justified. At that moment the present strike became inevitable.

During the absence of McGuire and the absence of suggestions from Senator Robertson, the agitation among the mine workers became a dead issue. With the presence of McGuire and the suggestions of Senator Robertson it was fanned afresh into a flame that is still burning.

That the Minister of Labor did encourage the Miners' Union in its stand and did not ask the Union to defer action is borne out in the following copy of a telegram sent to the Minister by the secretary of the union, which reads as follows:— "Reports in "press that we stated you had told us to go on strike "are false and we are preparing statement for the "press giving the developments throughout the "progress of the dispute. The only statement was "that you said you did not see that the department "could do much more, and that you would not ask "them to wait longer in view of the managers' at- "titude."

The following reply was sent by Senator Robertson to the Union secretary:

"Your telegram received and the statements contained therein are exactly in accordance with the facts."

Men who are neutral on the issue involved, and who are desirous of seeing labor receive just treatment are found expressing wonder at the stand taken by the Labor Minister, which is apparently to support the Western Federation of Miners even to the point of a strike.

The Cobalt branch of the G.W.V.A. recently appointed a committee whose duty it was to endeavor to bring the contending factions together. The views of the mine managers, according to this committee, are set forth as follows:—

"The Mine Managers will not recognize this Union. It is a branch of the International Mine, Mill and Smelter Workers, formerly known as the Western Federation of Miners. This Western Federation of Miners has a history of intimidation and terrorism. The managers have reams of correspondence, judicial and Royal Commission reports and other data to prove this. The local leaders are radicals, and, the managers believe, do not represent the main body of workers. By their ability to talk they got their radical views before the members, which appeals to the floaters, foreigners and discontents. The managers are all willing and anxious at all times to treat with their workers through individual committees elected by workmen in each mine, and this has proved successful. Union members are not discriminated against, and there is no objection to the men joining the Union, but the managers will protect their non-union workers. Conditions in Cobalt are of the best.

"The managers knew last fall that this trouble was coming, and even then all was well until the arrival of the Industrial Relations Commission resulting in a lot of radical propaganda in the Press. The Union served them with a 48-hour ultimatum and the Minister of Labour has tried to force recognition of the Union down their throats. He himself has said that the real dispute is the recognition of the Union. The managers accept his diagnosis. They will not recognize the Union, and therefore there is nothing whatever to negotiate. The Minister of Labour suggested that the managers go to Ottawa. They replied that they would not waste the time of the Prime Minister and himself by going to Ottawa when there is nothing they can concede, and when the correspondence sets forth their case so exhaustively. They have never been offered a Royal Commission, and have no power to accept or to refuse one. The Minister of Labor has tried to make them swallow the Union, and because they will not do so, he is trying to blame them for the strike. Again quoting their letter: "The present dispute is one between the Mines and the Western Federation of Miners, and in no case can it be considered as one between the mines and their employees.

The mines did not throw their men out of employment but the union did and since the mines will not deal with or through the Western Federation of Miners, the question of adjusting the present deadlock is one that must be seettled by the employees themselves. At present the majority of the mines are prepared to re-open under the old conditions as regards hours of work, base wage and profit sharing bonus, but as to how long that condition will prevail we are unable to advise."

The G. W. V. A. Committee concludes its reports as follows—

"Now, comrades, you have heard what both sides have to say, and you must bear in mind that we are not vouching for the accuracy of any of the statements. The indisputable fact is that both sides are absolutely at a deadlock. In fact we have felt that the Mine Managers, though they were very courteous and ready to give us information, were treating us with a certain amount of amused tolerance. They knew we were bound to fail as negatiators, for they will not negotiate. We have tried to be fair and impartial in this investigation, and give you an absolutely unblased view of the facts. There is one thing that you may be assured of and that is that we

have not leaned to the employers' side as we have been accused of being tools of the other parties.

"There are a few other points to which we would draw your attention.

(1) The operators will not conciliate. The Union has shown a very marked tendency to conciliate. This you may construe as evidence of strength or evidence of weakness.

(2) The operators refuse to go into print. The Union has gone into print. This also you may construe as evidence of strength or evidence of weakness.

(3) The operators claim that the Union officials do not represent the main body of workers. The Union officials claim that they do.

(4) The operators will bait no hook to entice the men back to work. Anything they may contemplate doing, if they do contemplate attempting improved conditions for the men, will not be considered unless or until the men return to work.

(5) The operators says that they have and always will give the returned men the preference over the alien enemy; that if an alien has a job that a return man can fill, the alien enemy goes. (This of course is not a bone of contention with the Union.)

"This comrades, is our report. We are sorry that we cannot settle the strike. We have failed as others have failed. The trouble is that when we beat the Boche, we did not distroy distrust, bitterness and rancour. At the same time we sincerely hope that the information we have gathered together and submitted to you will not be altogether unproductive of results."

Developments may now rapidly occur, and attention is directed on four considerations.

First, is the proposal of the G. W. V. A. to proceed with the organization of a local union under an Ontario charter unconnected with the Western Federation of Miners, or the Mine, Mill and Smelter Workers Union. The executive selected are all mine workers,. Second, the attitude of the mine managers toward the scheme is being awaited with extremely keen interest, the general impression being that the plan will meet with their approval. Third, is speculation as to what counter measures the radical executive of the Western Federation faction may adopt to combat the move that threatens the existence of the W. F. M. in this its last stronghold. Fourth, is how the great body of mine workers will view the matter.

The present executive of the Cobalt Miners' Union was elected last Winter, its plaform being to cling to the International. The opposition, made up of the moderates, were defeated on it platform of breaking away from the International and forming a local union. There would now appear to be great probability of the moderates joining forces with the G. W. V., in which case the Western Federation which is being kept alive by "Jimmy" McGuire would fall.

Provided the mine managers will lend their support to the plan of the G. W. V., there is a likelihood of the strike being broken in a short time, facilities provided for collective bargaining with the moderate element representative of all workmen in the camp, and consequent reasonably harmony as a result of open discussion.

As a result of the present favorable developments, and the probability of further rapid action, a spirit of genuine optimism is again abroad in Cobalt and there is a feeling that the radicals have failed to make good their boast that they could put the country on the "bum".

Latest advices are that members of the Union have been forbidden to vote in the referendum which has been arranged by the G. W. V. A. Committee, on penalty of expulsion from the Union.

A secret ballot has been arranged, Major J. D. MacKay and Major J. E. McCuaig, ex-Mayor of Haileybury, being the returning officers. All men on the July payroll of the companies are eligible to vote. August 19th is polling day.

The vote is to be taken on whether the men shall return to work immediately on the terms negotiated by the Soldiers' Committee with the Mine Managers Association, which provide for the old conditions, consideration of the cost of living problem, the appointment of local committees elected by the men for each mine, and the election of a central council to deal with the Managers Committee, no discrimination, and the granting of a day's holiday during the week to men compelled to work on Sunday.

Some Recent Improvements In Steam Hoisting Engines

By F. A. McLEAN.

To meet the demand for small and medium sized hoisting engines for mining and industrial purposes the Canadian Ingersoll-Rand Company, Limited, Montreal, Quebec, has just placed on the market a line of such engines of rugged construction, in several sizes, in which are embodied many improvements which have been adopted as a result of their long experience in the manufacture of mining machinery, and knowledge of the unfavorable conditions under which mine hoisting machinery is sometimes forced to operate.

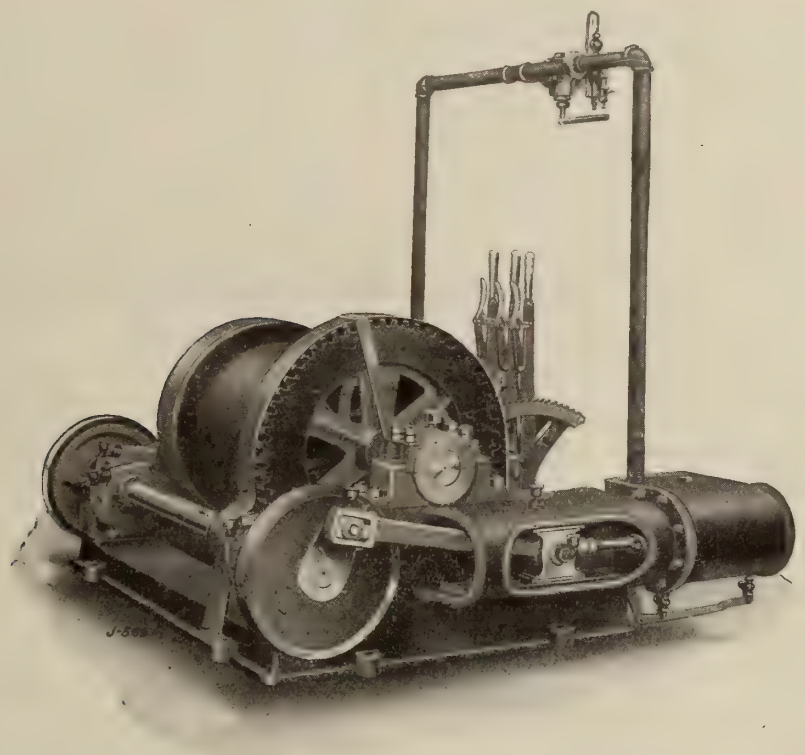
Before going into the manufacture of these hoists its was decided to produce them in quanutities on the interchangeable part system, using jigs and fixtures and finishing all parts to close limits, the value of which had been thoroughly demonstrated by their experience in the production of shells and ship winches in large quantities during the war, as well as in the manufacture of their rock drills and pneumatic tools. At present the company is building these hoists in five sizes ranging from 8 x 8 to 10 x 12 inches with conservatively estimated lifting capacities of from 4,000 to 10,000 pounds and will build them in larger sizes on special order.

Some points of particular interest in the construction of the new "CIRCO" hoists are as follows: Cylinders are cast separately from the side frames and being identical in construction are interchangeable, permitting one spare cylinder to be used on either side of the hoist and eliminating the necessity of scrapping the side frame should one of the cylinders be accidentally damaged.

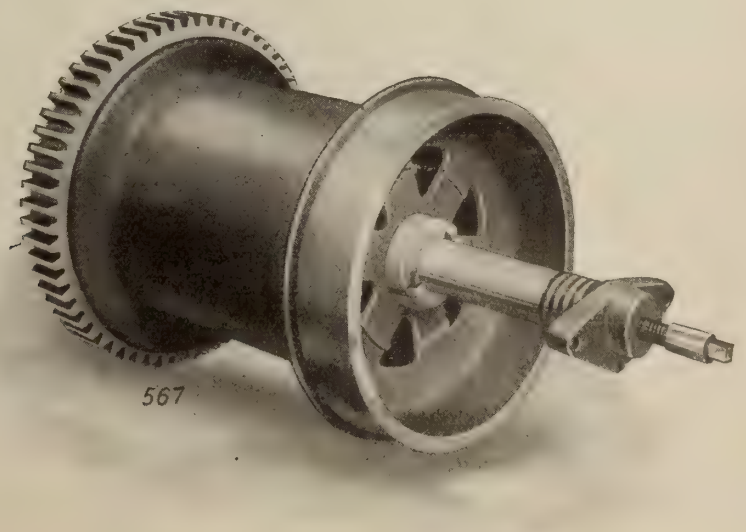
The valve chest is provided with two openings allowing the exhaust pipe to be connected to either the top or bottom of the valve chest as may be most convenient. the opening which is not in use being closed by a plug In case it should ever be found necessary to operate the hoists by compressed air this extra opening will be found of considerable value as it will enable the air to exhaust to the atmosphere much more freely than is possible with the older styles of valve chest. The cylinders are bolted to the side frames by strong lathe turned studs and faced nuts and the walls are so proportioned as to permit the operation of the hoists at maximum pressure after reboring. The steam ports are made as short and direct as possible and are of large areas. Exhaust passages are so designed as to reduce back pressure to a minimum.

The ease with which the cylinders may be changed is characteristic of the entire machine, all parts being made to close limits and of the best materials obtainable, thoroughly inspected throughout the successive steps of manufacture. The ease with which these hoists may be taken down should make them of special value for use in isolated mines where the machinery has to be taken apart and transported long distances by horses or mules. The valves used are of the plain slide type fitted with an adjusting device which compensates automatically for wear without changing the original alignment of the valve rods. The valve guide blocks are of finished cast iron accurately fitted to babbitted guides cast on the side frames.

Eccentrics of the locomotive type are used having deep flat rods bolted to the eccentric straps by lathe turned bolts in holes reamed after the valves have been set, thus preserving the accuracy of the original setting. The eccentrics have large bearing surfaces and are adjustable for wear at the pins. Connecting rods are of steel of the solid end type with bronze boxes in both crank and crosshead ends which are adjustable for wear by means of screws and wedges. The screws are adjustable in opposite directions so as to insure approximately the same length in each rod. The crank pins and crankshaft are made of the highest grade of open hearth hammered steel fitted to cranks of the counter-balanced disc type by hydraulic pres



View from Right Hand Crank End, Single Drum 7x10″ Hoist



Drum, Drumshaft and Friction Device

sure. The crank discs are finished all over and to insure accuracy they are turned and the holes for the crank pins bored after the discs have been pressed on the crank shaft.

The usual practice of casting the drum shaft bearings integral with the side frames has been departed from by casting them separately and bolting them to the frames. A high grade of babbit is used in these bearings, which are adjustable for any wear which may occur. The drum is made from a tough, close grained, grey iron casting, turned, bored, and tested for balance, and a good running fit on its shaft. The drum bearings being bolted to the frames, permit accurate alignment of the drum and engine shafts, and ensure easy running gears. A heavy brake ring is cast on one end of the drum and on the other is a friction of the heavy "V" type, which has demonstrated its efficiency for this class of service. The brakes are proportioned so as to have a holding capacity considerably in excess of the maximum load which the hoist is capable of lifting; a feature which should be of value in emergencies, or should the hoist be accidentally or intentionally overloaded. The drum driving gear and shrouded pinion are made from semi-steel, a material which has been found well suited for this purpose. The pinion is fastened to the crank shaft by a large key allowing it to be easily removed when necessary.

When reversible engines are desired the hoists are fitted with a Stephenson reverse gear, operated by a hand lever with quadrant and locking latch which is placed near the clutch and brake levers in a bank at the operator's stand within convenient reach of the throttle facilitating the easy operation of the hoist.

The Canadian Ingersoll-Rand Company, also build two styles of hoists of smaller capacities than their new "CIRCO" hoists, known as the "Little Tugger," and the Special. The former is of the Dake or square piston type, and the latter is of the diagonal reciprocating type with trunk pistons. Either of these hoists may be arranged for operation on steam or compressed air. Being of simple rugged construction, and requiring no special foundation, they may be readily moved from place to place, are easily handled by unskilled labor, and are particularly adapted to light hoisting and hauling jobs in winzes raises and prospect shafts, such as handling drills, mountings, steels, timber, muck, or for hauling small ore cars up a grade, and similar classes of work within range of their capacity, which in the case of the Special is 1,400 pounds and 1,000 pounds in the "Little Tugger."

INSTITUTION OF MINING AND METALLURGY OPPOSED TO NATIONALIZATION OF COAL MINES.

The following resolutions were adopted by the council of the Institution of Mining and Metallurgy at a meeting specially convened for the purpose held on the 23rd ult.:—"That the council of the Institution of Mining and Metallurgy, as representing the technical interests of important national industries consuming large quantities of coal, view with grave concern the serious diminution in production and increase in the cost of British coal, which have developed since the present trend of Government intervention became operative." "That the council consider that the published evidence given before the Coal Industry Commission has failed to establish either the necessity for, or the expediency of, the nationalization of the coal mining industry." "That the council are strongly opposed to the State ownedship of the coal mining industry, as they are of the opinion that there is no evidence to support the assumption that nationalization would result in an increased output or in a reduction of labor stoppages." "That the council are prepared to acquiesce in the recommendation embodied in the Report of the Chairman of the Commission for the acquisition by the State of coal royalties, with the proviso that "fair and just compensation to the owners' be paid." "That a copy of the foregoing resolutions be sent to the Prime Minister."

MANITOBA

The Pas, Aug., 6.—Mr. J. P. Gordon returned from his claims north of Copper Lake bringing with him samples of quartz. These consist of lumps of quartz, some of them weighing many pounds, matted by string and leaf gold that form fully 50 per cent. of the mass. The gold is as massive in the quartz as the silver in calcite at Cobalt. The vein is said to be six feet wide and parallels the big dike.

The original discovery was made by an Indian prospector, Jacob Cook, some time ago, and it was while investigating this that Mr. J. P. Gordon made a further and richer discovery.

Other prospectors took up the hunt, and now the vein has been traced for 6,000 feet, the samples shown being taken from a depth of three feet.

A considerable number of claims have been staked in the locality, the best known being the Peterson group which lie a little to the north of the Gordon discovery.

The new discovery is only some 70 miles from The Pas as the crow flies, but owing to lack of transportation facilities prospectors are compelled to travel nearly twice that distance by following the waterways to reach the gold fields.

John W. Callinan, of the Flin-Flon properties headed for the new find yesterday in his own motor boat. He thinks the discovery is a big thing.

Messrs. Hassett, Owens and quite a number of others interested in mining matters, left for the Gordon-Peterson claims, north of Copper Lake on Tuesday night's Ross boat.—From the "Herald."

BEATRICE MINE, CAMBORNE, B.C., TO RE-OPEN.

The "Journal" is officially informed that R. R. Christie, of the New Era Mining Company, bondholder for the Beatrice Mine, has left for Camborne with a crew of men to re-open this well-known silver mine, and that it is the intention of the company to keep a fair-sized crew on the ground all winter.

Hazelton, B. C.

The Rocher de Boule Mine has been closed down and it is doubtful whether development will be continued this season.

Nelson, B. C.

After a period of idleness of some years the McAllister mine on the north fork of Carpenter Creek, near Three Forks, is resuming operations. It has been taken over by the Slocan Silver Mines, Limited, F. W. McDonell being foreman. This is a well-known property. It has been developed on three levels, and has a dry silver ore.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS.

Mr. Charles Schwab will be a speaker at the banquet of the American Institute of Mining & Metallurgical Engineers to be held in Chicago September 22nd to 26th, inclusive. Elaborate plans for both the technical and social side of the meeting have been perfected. Engineers who take the trip to Chicago for this meeting are assured of one of the most interesting annual meetings which the Institute has held. In addition to some hundred and fifty papers which have been prepared for the meeting, trips to the zinc smelting districts, the steel works at Gary and the refineries at Whiting and East Chicago are included. A boat trip on the lake together with numerous social events have been arranged for the ladies. The Fifth Annual Exposition of the Chemical Industries will be held in Chicago at the same time as the meeting of the American Institute of Mining & Metallurgical Engineers and members of the Institute are cordially invited to attend the exposition and become better acquainted with the allied industries.

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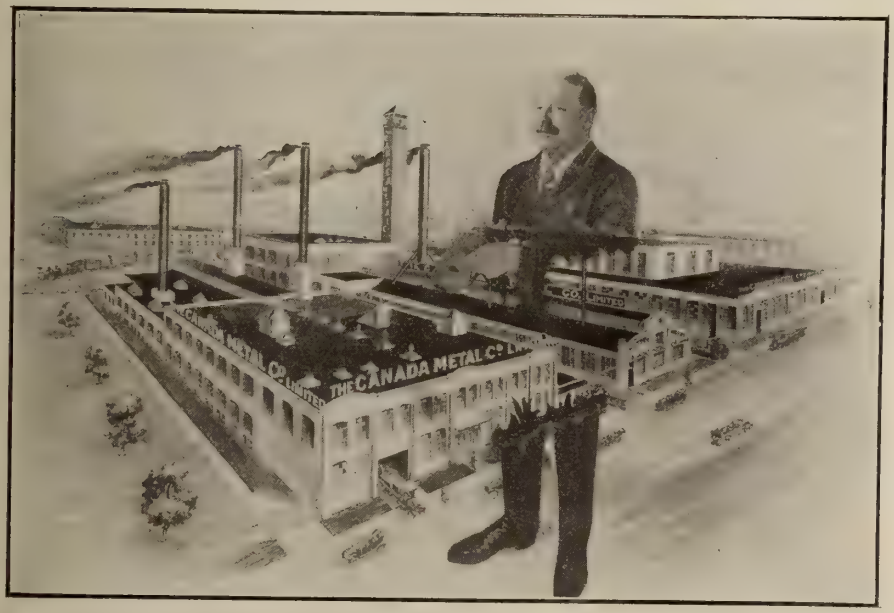

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EDITORIAL

COBALT STRIKE—STATEMENT OF THE MINE MANAGERS.

At the request of the President of the Temiskaming Mine Managers' Association we are pleased to publish in this issue a statement outlining the position of the Association in reply to the statement of the Minister of Labour published in the "Journal" of August 13th.

THE WIDER OUTLOOK OF THE U.S. COAL TRADE.

A significant innovation in our United States contemporary "Coal Age" is a page devoted to "Foreign Markets and Export News" which contains news relating to the coal requirements of such widely scattered countries as Switzerland, South Africa, New South Wales, South China and Russia. This is one of the many indications that our United States friends have apprehended the opportunity for export coal business that now presents itself through the paralysis, and in some instances the "hari-kari" of the European coal-trade.

In Canada, unfortunately, it will not be time for us to talk about exporting coal until we can supply our own requirements, or more correctly put, until we do supply our own requirements. That we *can* do this is not a matter for debate.

For comparison, one may note that South Africa has increased its coal production from 8,801,000 tons in 1913 to 10,383,000 tons in 1917, and that Japan's coal production has increased from 21,083,000 tons in 1913 to 27,500,000 tons in 1918, and it may be further remarked that Japanese coal is produced under conditions of great physical difficulty.

Compare the area of Japan and its coal resources with the area of Canada and our much larger coal resources, and it is hard to excuse a coal production in Canada of around 14,000,000 tons, particularly when Canada uses 35,000,000 tons annually.

THE FIVE-DAY WEEK FOR COAL-MINERS.

Old-fashioned folk, who in the erring and thoughtless days of their adolescence and later youth, absorbed the teachings of Poor Richard's Almanack, of Smile's "Self-Help," Emerson's "Essay on Self Reliance," Todd's "Self-Culture," Solomon's Proverbs—yes, and the Ten Commandments also, and later on, when contact with men and things brought disillusion, consoled themselves with the mild sceptism of Ecclesiasticus and Omar, do not quite know what to make of this present-day world, when work is regarded as a thing abhorred, and unoccupied leisure appears to be the desired haven of all mankind. Unoccupied leisure for a selected number that is.

The worker who desires a free Saturday and Sunday, for example, has no compunction in working the tram employees and restaurant hands seven days a week and all holidays. His idea of rest is making someone else work.

The old-fashioned idea that production could only be obtained by hard work seems to have suffered eclipse, but there must be some truth in the ancient superstition, because Lloyd George has recently stated that the reduction of hours of labour in Britain has reduced the production almost in the same mathematical proportion. The Premier, who knows as much about work as any man, did not attempt to explain how the same revenue could be produced by a decreased output, in fact he was unkind enough to say it could not be done. He said: "We shall never improve matters until we increase production, or we shall be driven later to reduce even lower the standard of living in Britain. There is no other alternative except quitting the country for which we fought for four years."

One is surprised that Mr. Lloyd George should so revamp the primeval curse, and intimate that man has to earn his labour by the sweat of his brow. The phrase is not even polite English in these days, and yet it is a most accurate description of one of the eternal verities.

The feature that saves us from the worst that can be done by the cloud-capped amateur reformers who would smash the present scheme of things and re-fashion it nearer their heart's desire, is that many mooted changes ignore the domestic relations of men as much as they ignore the immutable principles of economics. Labour leaders forget that idleness in itself is a distressing state to all normal men, and they also forget that man is a monagamous being, and that in civilized countries marriage is a partnership involving a fair apportionment of human labour.

It may be permitted, without impertinence or any desire to interfere with private affairs, what the miner's womenkind wil say to a five-day week, with, of course, the inevitable five days' earnings that will accompany such an arrangement. By no method known to man can five days' work produce as much coal as six days' work.

As the initiated know, Saturday morning, in ordinary households, is the time when men are not desired around the house, unless they desire to help in the domestic work. How will a healthy man occupy himself on Saturday morning? In the summer he can find occupation pleasant enough, but in Cape Breton the summer is all too brief.

There are no reading rooms, nor social clubs at any of the Nova Scotia collieries. There are not even the social facilities afforded by saloons, for theoretically the sale of intoxicating liquor is forbidden in Nova Scotia. At collieries it is twice forbidden, first by the Coal Mines Regulation Act, and secondly by all the penalties of the Nova Scotia Temperance Act, but, as everyone knows, liquor is sold in large quantities, with all the dire results that follow "blind pigs" and illegal dives, and the kind of prohibition that does not prohibit.

Those who preach "up-lift" and ethics that ignore the habits of the average adult, will say that there are many useful ways in which men can employ their leisure, and so there are, but it will not work that way.

The miner's leisure—if he takes all Saturday off—is likely to prove a greater problem to himself than it is to others, for miners are not given to mere loafing. Very few men can loaf—and be happy. And no good can come of a scheme that will make additional work for others, and will at the same time reduce the miner's output, his earnings, and, as seems likely, his domestic peace.

SICKNESS RELIEF SOCIETIES.

The announcement that the mining companies in the Porcupine District contemplate forming a society for the relief of loss of earnings among the mine-workers arising from sickness and non-occupational disability, shows a proper appreciation on the part of the mine managers of the real necessities of their employees.

The Workmen's Compensation Act provides relief in cases of accident arising out of employment risks, but statistics show that the amount of lost earning power caused by non-occupational disability is only half that caused by occupational accident. While the miner lives a healthy life, as vital statistics prove quite conclusively, there are certain diseases to which he is unusually exposed, and in no occupation is there so indeterminate a line of demarcation between occupational and non-occupational disability. This "shadow-line," as it is is called by those who have specialised in insurance and accident statistics, affords much scope for malingering, as it also, in many cases, has worked undoubted hardships to men whose disability was obscure in origin or in symptoms.

The miner needs insurance against sickness just twice as badly as he needs insurance against accident, and no better way has yet been devised than that of the mutual benefit association such as is proposed at Porcupine.

The knowledge that some income will be forthcoming in the event of sickness often prevents sickness by lessening mental anxiety, and it certainly lessens the number of compensation claims. The mine owners themselves benefit largely by the institution of a mutual benefit association, as where the mine-owner is at once paymaster, landlord and general provider for an isolated mining-camp, he must of necessity help his workmen when they are disabled by sickness, even were he not possessed of the ordinary compassion of average men. All mine managers know what long sickness of workmen occasions in the matter of private benevolence, but they do not talk about it.

No proposal that has been made in the North Country promises so much in the way of real co-operation between employer and employee, or will tend to such comfortable relations as the inauguration of a really adequate and permanent system of sickness relief in the mining camps. It is essential, however, to the success of the proposal that the miners should themselves contribute the greater part of the fund required out of their own pockets, and that they should accept the full share of responsibility of management and supervision of the undertaking that their proportionate contribution requires.

THE FUTURE OF THE BRITISH COLLIERIES.

Premier Lloyd George has announced that the Cabinet has rejected the recommendation of the Sankey Report for the nationalization of the coal industry, but has accepted the principle of acquisition of the mineral rights by the State, and a measure of public control over the coal trade, but not so extended as to kill the healthful stimulus of private enterprise. The Government's policy, therefore, follows very closely the recommendations made by Sir Arthur Duckham, Director of Aircraft Production, and a Government nominee on the Coal Commission. The text of the Duckham report will be found on page 649 of this issue.

One of the very curious reasons advanced by Justice Sankey in favour of nationalization of the coal mines was that the miners refused to work for the colliery owners, and that he could see no prospect of harmony unless the miners worked for some other body of persons. Like many other persons, with smaller mental capacity than a Chief Justice, he suggested the Government might try its hand at the difficult task of raising wages and at the same time keeping down the price of coal, and of increasing coal output while simultaneously decreasing the hours of labour.

The Yorkshire strike was cited by the Premier as evidence that Government control did not necessarily mean harmony.

By accepting the principle of state ownership of minerals, and taking the responsibility of "supervising and controlling all mineral rights throughout Great Britain, so as to ensure the proper working of all minerals," Mr. Lloyd George has announced that the British Government considers the coal-seams of Britain as forming part of the public domain, with all the implications that such a momentous decision carries with it.

By rejecting the nationalization proposal, the Premier has announced that the British Government does not accede to state control of labour.

From these two things it may be deduced that the

British Government has awakened to the dangers of confusing industrial conditions with politics, and those who wish to see the rights of all the people upheld and preserved, and deny the right of any one class of the population to demand special treatment and extraordinary political privileges irrespective of the remainder of the population, will be encouraged by the clear-cut distinction made by the Premier.

It is fortunate that the demand for unprecedently preferential treatment should have been made by the coal workers, because coal is the basis of Britain's industrial fabric, and there is no man so poor or insignificant in Britain but his pocket has been touched and his comfort threatened by the overweening demands of the miners' leaders. The miners do not seem to have regarded themselvs as being members of the body politic, but as being deserving of peculiar honour and exclusive privilege. The supreme importance of coal in the prosecution of the war, and the all-important asset of coal in national industry is perhaps responsible for this misconception of the miner's political position by himself, and the acceptance of this high valuation by others, but when the President of the Board of Trade anounced recently an increase of six shillings per ton on the selling price of coal, the country saw that it was paying too dearly for special privi lege attaching to one selected class of workers.

The acquisition by the State of the coal seams is to some extent but a rectification of past mistakes. The inheritance of large landed estates from ancestors who lived before the invention of the steam engine made coal a valuable mineral is not a subject for profitable debate. The point of view will depend largely upon one's ancestors. But the Enclosures Act of 1790, which conveyed large tracts of common lands to the lords of the manor greviously erred in that it did not reserve to the Crown the underlying mineral rights. In this respect the State in deciding to acquire the minerals will re-enter into possession of an asset it should never have given away to private owners.

Those who have had practical acquaintance with the management of large coal properties will be interested in Sir Arthur Duckham's recommendations for the amalgamation of all mining properties in specified districts for the purpose of obtaining the best economies and efficiencies in the winning and working of coal. particularly to ensure the most efficient draining and pumping, the most rapid transport of the coal to the surface and the miner to his work; the obtaining and distribution of power from one centre, and the prevention of waste of coal by artificial barriers and interfering leases and way-leaves.

Another recommendation in the Duckham Report which applies especially to coal-mining conditions in Canada, is that "the general extension of multiple shifts, as the most ready means of increasing output, "reducing costs, and improving wages to the workpeo- "ple as a whole should be immediately considered by "a joint Committee of the Government, owners and "miners."

Our readers will recollect that the "Journal" has on a number of occasions made a similar recommendation in order to overcome the decreased output, increased costs and smaller wages which must necessarily accompany the reduced hours of labour recently adopted in Canadian collieries.

U. M. W. DISTRICT NO. 18 RESUMING WORK.

It is reported from Ottawa that sixty per cent of the collieries in the Fernie and Edmonton fields have resumed work. This news, which is a consequence of the repudiation of the O.B.U. movement by the mine-workers, is good news. Few coal fields have been so wantonly hindered in business expansion by continued strikes as District No. 18, and it is to be hoped that a longer period of uninterrupted work than has been usual is now commencing.

PERSONALS.

J. R. McNeill, for the past eight years manager of No. 11 Colliery of the Dominion Coal Company, has resigned his position, and will take the managership of No. 3 Colliery (Florence), of the Nova Scotia Steel & Coal Co.

W. R. MacDonald, manager of No. 6 Colliery of the Dominion Coal Company, has been appointed Safety Inspector. T. Chew, underground manager of Dominion No. 2 Colliery, has been appointed manager of No. 6.

Mr. C. H. Hitchcock is at West Shiningtree.

Mr. Bennett is at the Gosselin property, Shiningtree.

Mr. R. Pearce, editor of the "Northern Miner" has been visiting the mines of the Wasapika gold area.

Mr. H. S. Robinson, formerly superintendent at the Trethewey mine is now at the McIntyre gold mine. He recently returned to Canada after serving in the U. S. army.

Mr. Evered, manager of the Davidson gold mine has returned to Porcupine after visiting the Herrick, Wasapika and West Tree properties in the Wasapika gold area.

Mr. A. H. Brown, mines inspector, recently visited the Wasapika gold area.

Mr. Geo. R. Rogers, president of Wasapika Gold Mines, Ltd., is at the property.

Major H. Whittingham has been demobilized, and has returned to Sardinia as superintendent of the Gennamaru mines. His address is Ingurtosu, Arbus, Sardinia. Some years ago Major Whittingham was on the staff of the Nipissing Mining Company, at Cobalt.

Mr. H. C. Carlisle who was in charge of the operations of the Mandy & Co., in Northern Manitoba, is now with the Tonopah Mining Company at Tonopah, Nevada.

Mr. William J. Hamilton, of the Cerro de Pasco Copper Corporation of Peru, is visiting his home at Westmount, Quebec.

A STATEMENT FROM THE MINE MANAGERS ON THE PRESENT STRIKE CONDITIONS IN COBALT, ONTARIO.

In the words of the Minister of Labour, the present labour dispute in Cobalt has narrowed down to a positive difference of opinion as to whether or not the local branch of the Western Federation of Miners, now known as I.U. of M.M. and S.W. should be recognized. On one side the Union officials and the Minister of Labour insists that it must be recognized, and on the other side the Mine Managements are just as positive in their determination that the Union will not be recognized until at least the laws of Canada are so amended as to make such recognition obligatory.

The criticism heard on the street and apparently emanating from those who may be described as the agitating minority is that the Mine Managers have taken an arrogant stand and have refused to discuss the question of recognition or any other points that may be made an issue with the men themselves. We believe that no mine manager has ever refused to discuss any question with either his men individually or with a committee of his own men elected by his own employees. We believe that in all cases where a request was made to meet and discuss matters, and in fact where the desire was merely indicated, the managers have always willingly and gladly discussed the points thus raised in a friendly and sympathetic spirit. On this basis the charge, namely that the managers have refused to meet their own men, falls of its own weight and the fact that the men of Cobalt did not ask to discuss the questions involved in the present controversy with their managers shows that they were entirely indifferent to the results contingent upon a strike, or that they were prevented from so discussing these questions by the Officials of the Miners' Union.

For the past twelve years there have been strikes threatened by the same organization. Strike votes have been taken and a large majority in favor of strike announced, but for some reason or other the officials in whose hands was placed the authority to take action or not, as they saw best, were not inclined to put the feeling apparently expressed in that strike vote to a test.

At the time the Royal Commission was appointed to investigate and advise on industrial conditions, the membership in the local Union was something less than twenty-five per cent. of the men employed in Cobalt. With the appointment of this commission, a movement was put under way to increase the membership and at the time the Commission visited Cobalt in May of this year, probably fifty per cent. of the employees were paying dues to the Union. In the wake of the Commission as they travelled East across the continent from the Pacific Coast, strikes in many large centres developed, led by men of extreme Socialistic tendencies, culminating in an attempt to establish Soviet rule in the city of Winnipeg. (Later Queen and Dunn, leaders in this same strike at Winnipeg, were invited to Cobalt, met by Union officials and on the night of July 18th were escorted by Union members to the rink, accompanied by a band, thus being honored as no other visitors to the Union had ever been honored before.)

Taking advantage of the general feeling of unrest in industrial localities elsewhere, the agitating minority of the local Union created a manufactured situation in Cobalt and as a result an ultimatum, with a time limit of forty-eight hours, was served upon the Cobalt mines. The Union demanded a largely increased wage, a forty-four hour week with forty-eight hours pay, time and a half for overtime, double time on Sundays and legal holidays, with recognition of the Western Federation of Miners, and the check-off system The latter it might be explained means that the mines would become responsible to the Union for all dues assessed on the men and that no man would be allowed to work on the properties who was not a member of this Union and in good standing, or in other words, the mines would thereafter operate on a closed shop basis.

No response in reply to this ultimatum having been received by the Union, they advised the Minister of Labour that we refused to treat with them and received a reply from the Minister asking in a most peremptory manner that the Union furnish him the names of those Companies that had refused to treat with their men.

This was on the eve of the taking of a strike vote by the men and the Minister's request was conspicuously posted at the polls.

The plain inference in this was that he would force any such companies to treat with the Union irrespective of any laws then existing in Canada, in all of which his attitude was not unlike that of many Union agitators.

A strike vote was then taken and it followed that under such circumstances a large majority for a strike should be officially announced.

The Department of Labour at Ottawa was advised concerning conditions, presumably by the local Union and a representative of that Department, at the request of the Minister of Labour, visited Cobalt and made a careful study of the situation. We have reason to believe that this report confirmed the position taken by the mine managers and believe that had the Minister of Labour taken an entirely neutral position in this controversy, that report would have been published.

At the request of Mr. Quirk, referred to above as representative of the Department of Labour, we confirmed our verbal statements to him in a letter addressed to the Minister of Labour under date of June 7th.

In this letter we pointed out that we were already practising collective bargaining in dealing at all times with groups or committees of our own men, but that we did not concede collective bargaining if such bargaining was of necessity through the Western Federation of Miners. We pointed out that the accusation of discrimination as brought against us by the Union was without foundation, since there was no disposition on the part of any management to refuse an applicant for work because he was a member of the Western Federation or any other Union. We maintained that living conditions in this camp, educational facilities, hospitals and recreation were perhaps better than in any other Canadian mining camp; that through the means of a bonus based on the price of silver, the wages were higher than that of any other camp and that the average wage in the largest mine operating in Cobalt was then $4.35 per shift, which has since been increased by an additional bonus of twenty-five cents, making that average at the time the strike took place $4.60 per shift.

The Minister of Labour was furnished with many decisions from Supreme Courts, Coroners' Juries, Royal Commissions, various Governors, and President Roosevelt, all dealing directly with the Western Federation of Miners and Charles Moyer, its President,

showing conclusively that the history of the Western Federation of Miners is a record of intimidation and in many cases incendiarism and murder. In reply, on July 16th, the Minister of Labour disregarded all these authorities, and advised us to follow the suit of one Western operator, who had "every respect" for Mr. Moyer. Moyer's record is well known, not only his past, which the Minister of Labour would forget, but also his more recent affairs. In addition to the manner in which he carried on the Michigan strike in 1913-14, were his strikes in Arizona during a time when the United States Government was calling for a steady output of minerals for war purposes; his personal incitement of Mexican labor at the border-line camps in Arizona in 1916 during the time of the Villa raids. Yet this is the man, Charles Moyer, still surrounded by the system and organization which he knows so well how to manipulate, one of the organizers and first executives of the I.W.W., that the Minister of Labour would force us to recognize and consult, in the belief that unionism of any kind is better than industrial peace and contentment of employees.

Since that time the Minister has seen fit to give to the Canadian Press a statement to the effect that while the history of this organization prior to the presidency of Mr. Moyer may not have been above reproach, that under his guidance their methods and policy were changed and that to-day the organization is beyond serious criticism.

To confirm his first statement, let us quote some extracts from report of the Royal Canadian Commission—Industrial Disputes 1903, made by the Chief Justice of British Columbia, and Rev. Elliott Rose.

"It is obviously against the public interest that any body of Canadian workmen should be subject to be called out on strike by a foreign authority over whom neither our legislatures nor courts can exercise any control, and that whether they have any grievances against their employers or not. **Whether the wheels of Canadian industry shall run or shall rust ought not to depend upon the decrees of a Secret Council at Denver.** With regard to the organization we think

They ought to be specially declared to be illegal, as their leaders have shown that they care nothing about the obligation of contracts or about the interests of their employers, against whom they are ever fomenting discontent.

That they ignore the constitution and rules of their own organization whenever it suits them to do so.

That they at all times preach the doctrines of confiscation of property without compensation.

That society is divided into two classes, the toilers and the spoilers.

That they justify the use of the boycott and the sympathetic strike.

That they do not disprove of violence and intimidation.

That they are wholly indifferent to the loss and damage that they inflict upon the public, and

That they recklessly allow suffering and privation to befall the families of their misguided followers with regard to whom they are constantly guilty of deception and concealment."

To disprove his second statement and to show that under the leadership of President Moyer their methods have not changed and that violence and intimidation are still their ready weapons, we quote as follows from a decision handed down by the Supreme Court of Michigan in connection with the strike that took place at Calumet during the latter part of 1913 and the early part of 1914. The case concerned the Western Federation of Miners as one of several defendants.

"The affidavits, 84 in number, are freighted with narratives of rioting acts of violence, threats, insults, and intimidation of men, women, and children, too numerous to attempt to repeat here, fully substantiating and showing continuation of the unlawful conduct by Defendants. The affadavits are not only made by employees of complainants and their families, but by others,—officials and private citizens—in many walks of life. They tell of strikers, members of defendant federation and their sympathizers, parading with noise, and insults, and threats, attacking, assaulting, etc. Threatening violence not only to themselves but to their families, to kill, to dynamite, and blow up their homes. Defying the civil authorities, resisting and assaulting officers, of resort to firearms in which employees of complainants, and others were wounded, and other overt acts of lawlessness, disorder, and violence, **clearly substantiating the allegations in complaint's bill, and fairly indicating concerted action on the part of defendants to promote the strike by an aggressive policy of force and intimidation."**

On July 1st the Minister wrote suggesting that a committee of the men elected from each mine should meet the Mine Managers with a view to conciliation, and crystallized the situation as he saw it in the following words:—"**It would appear that the real dispute existing is not so much one of wages but rather a question of the recognition of the Miners' Union.**" On July 2nd we received a letter from the local Union reading in part as follows:—

"We further accept his suggestion to have a representative of the employees of each mine in the Cobalt camp, also of the Northern Ontario Light and Power Company, participate in this meeting, **and without executive committee to represent the Mine Workers' side of the case. The employees of each company to select their representative.**

It is to be noted here that the Union did not accept the Minister's suggestion but insisted on injecting their own executive committee into any such conference.

Replying to the Minister's letter of July 1st we regretted that previous correspondence had not clearly conveyed to the Minister our attitude regarding the Western Federation of Miners and pointing out that he could not expect, having consideration for information previously supplied, the employers of labour and the non-union workers would be contented under the dictation and at the mercy of men of the stamp of Charles Moyer, Jas. Simpson and the Rev. Ivens. We further stated as follows— "We cannot accept your suggestion that we meet a committee made up of representatives from each mine for the reason that the Union, through its organization, would be able to elect its own members to the practical elimination of the non-union men and the committee would be in fact a Western Federation committee. Negotiations with such a committee would be useless."

We with all respect decline to join in a request for a Board of Conciliation since in the words of the Minister himself, the only point to be considered would be the recognition of the Western Federation of Miners, which we would not concede and the result could only mean a continued unsettled labour situation.

On July 14th we answered a wire from the Minister reading as follows:—

"Your letter 10th received this morning. After consultation with Prime Minister it is deemed desirable that delegation representing the Temiskaming Mine Managers' Association should come to Ottawa for consultation with **some** members of the Government on Wednesday morning. The delegation is invited to meet the undersigned at the Department of Labour at 9.30 o'clock Wednesday for preliminary discussion prior to meeting Prime Minister and other members of the Government. The question at issue is one concerning which the Peace Conference itself has gone on record and it has therefore become a matter of international policy, hence the importance of a conference to discuss the matter. Please advise if invitation for Wednesday is accepted."

Mr. McGuire, local chief agitator for the Western Federation of Miners had been in Ottawa in close consultation with the Minister of Labour for some time and this, to our mind, was clearly a plan of the

Minister's whereby we would willingly or otherwise be forced into a discussion of the situation with Mr. McGuire and other members of the Union. Moreover, it is apparent through evidence previously presented in this statemnt that the one and only question open for discussion at such a conference would be recognition of the Western Federation. This we had repeatedly and in all seriousness assured the Department of Labour we could not concede, for reasons above given, and we felt that, to take up the time of the Premier and other members of the Cabinet in discussing a question on which we had previously taken a positive stand, would be an imposition on our part and we respectfully declined the invitation for a conference, but requested that all correspondence be laid before the Premier.

Moreover, there was at this time a strong inclination on the part of the more conservative members of the local Union to withdraw from the Western Federation of Miners and with wages and working conditions admittedly good, continue satisfactory and profitable employment as heretofore existing. In other words, the impression prevailed, that without interference and active participation in the dispute by the Minister of Labour the situation was fast clearing, and the danger of strike practically nil.

On July 16th Senator Robertson replied in part as follows:—

"From information received it would seem important that steps be taken towards a settlement, not later than Saturday next, otherwise a general strike seems inevitable."

It is thus forcibly shown that the Minister practically served an ultimatum on the Mine Managers that they must attempt to conciliate and his statement makes plain that the method of conciliation meant recognition of the Western Federation of Miners, or that a general strike would be called on the Saturday following.

Further confirmation is supplied by the following wires exchanged between the Secretary of the Union and the Minister of Labour, and we would draw particular attention to the concluding sentence of Union's telegram and its unqualified acceptance by Senator Robertson.

To Senator Robertson:

"Reports in press that we stated you had told us to go on strike are false and we are preparing a statement for the press giving the developments throughout the progress of the dispute. The only statement was that you said you did not see that the Department could do much more, **and that you would not ask the men to wait longer in view of the Managers' attitude."**

(Signed) JOS. GORMAN, Secretary,
Executive Committee
Cobalt Miners' Union.

To Secretary Gorman:

"Your telegram received and the statements contained therein are exactly in accordance with the facts."

(Signed) G. D. ROBERTSON.

Again we wrote the Minister on July 21st pointing out that we had reason to believe that previous correspondence would enable Senator Robertson to explain to Sir Robert Borden why we thought such a conference would only be wasting the time of himself and Cabinet. We stated we would be pleased to discuss the matter in full with him, providing that after having read the correspondence, he, the Premier, was then of the opinion that any reasonable business man could knowingly enter into business relations with a foreign organization which is not amenable to the laws of Canada. On July 23rd we received a letter from Senator Robertson arguing that we, the Mine Managers, were entirely responsible should a strike be called.

In the Toronto Star under date July 26th Senator Robertson is reported as stating that we had refused to abide by the decision of a Royal Commission offered by himself; as a matter of fact the Mine Managers have never received such an offer of a Royal Commission from Senator Robertson, who on the contrary had telegraphed the Secretary of the local Union on the very day before the strike (July 22nd) that he was prepared to grant them a Royal Commission had it not been objected to by Mr. McGuire (the Union head) while in Ottawa.

Our knowledge of this wire to the Union came only indirectly through the Mayor of Cobalt and the Minister of Labour must know that his Toronto Star statement is grossly inaccurate. Why should the Minister's decision re a Royal Commission depend on Mr. McGuire? The Minister has a report from another Royal Commission of only two months ago, reading as follows:—

"We would point out that in centres such as Kitchener, Sudbury, Cobalt, Sarnia, Moncton, Grand'Mere, Shawinigan, where organized labour has not been encouraged, but where the wage scale and other conditions have been fairly satisfactory to the worker, as employers do not appear to have difficulty in obtaining an adequate supply of labour, an excellent object lesson is supplied. The original intention, as understood, of labour organizations, was to promote the welfare and better the conditions of labour generally, and if these purposes are adhered to there would be no room for criticism, but when the aims of the officers of these organizations become more political than industrial, encouraging unrest and fermenting dissatisfaction, an undesirable situation is created."

Finally we are forced to the conclusion that the Minister of Labour is much more interested in the absolute recognition of Trades Unions than in promoting industrial peace and harmony; seeing no difference, for example, between the Union of the Mercantile Marine and the Western Federation of Miners; giving little or no consideration to the fact that there is no dispute as to wages and working conditions but insisting, while the opportunity remains, in strengthening at any cost the authority and prestige of those who, like himself, are high in the councils of organized labour.

All the operators are willing and anxious at all times to treat with a body of their own men and employees of a number of companies have committees elected by themselves for this purpose.

At the time the strike was called, the lowest paid man on the pay roll was receiving $4.00 per shift and machine men $5.00 per shift.

The present dispute is one between the mines and the Western Federation of Miners and in no case can it be considered as one between the Mine Managers and their employees. **The mines did not throw their men out of employment, but the Union did** and since the mines will not deal with or through the Western Federation the question of adjusting the present deadlock is one that must be settled by the miners themselves. If this can be done in the near future, much suffering and hardship will be prevented, but if on the other hand the Western Federation can maintain their influence and authority, the mines will continue to flood, coal cannot be provided for winter operation, and of necessity operations will stand suspended at least until the Spring of 1920.

Special Correspondence

NORTHERN ONTARIO.

Porcupine.

The rumours of a few weeks ago relative to the resumption of work on the Porcupine V.N.T. mine were well-founded, it has been learned, but the plan failed to materialize due to various reasons, among which might be mentioned the labor situation. It would now appear probable that should a solution be found for the present deadlock in the labor situation in Cobalt, and which would add somewhat to the favorable labor outlook in the Porcupine Camp, the resumption of work on the Porcupine V.N.T. would soon follow.

The mine is equipped with a mill adequate to treat ore at the rate of around 100 tons daily. While cash in the treasury is understood to be fairly low, yet some 750,000 shares stated to be in the treasury would appear to be ample guarantee that not only can the present mill be utilized in building up a cash treasury, but the treasury shares should be sufficient with which to finance proposed construction work, including the addition of larger milling equipment.

It is rumoured in usually well informed circles that a revision of the terms as recently proposed may be made in connection with the negotiations being conducted with a view to merging the Thompson-Krist with the Porcupine Crown Mines.

It is understood that the Wettlaufer interests together with associates of Buffalo have interested themselves in the Lonsway group of claims, situated a few miles north from Golden City, in the Porcupine district.

It is proposed to carry out a more or less extensive exploration campaign toward which end a diamond drill contract has been let and the work already commenced by Messrs. Smith and Travers.

Mr. Irwin, one of the directors of the Foley-O'Brien mine, situated at the western outskirts of the town of South Porcupine, has returned to Buffalo after having paid a visit to the property.

It is understood that Mr. Irwin will probably make the recommendation to a meeting of the directors soon to be held that the mine be re-opened.

The general impression appears to be that the president of the Dome Mines will make good his promise to mark the beginning of next year by the disbursement of a dividend. At the time the promise was made, not a few mining men felt inclined to fear the likelihood of such a recovery in the financial position of the company. Information eminating from Toronto, and presumably from New York, would indicate that the mill has recently been treating ore at the rate of about 600 tons daily. This would correspond with the statement issued last spring in which it was declared to be the policy of the company, following resumption of operations, to gradually bring the mill up to a capacity of about 600 tons daily. This having now been achieved, further gradual increase would appear reasonable to expect. As to the average grade of the ore being treated, it is unofficially stated to yield about $9 per ton, in which case the daily output would amount to about $5,400, or at the rate of upwards of $160,000 a month. The cost of operating is understood to be high, but the general opinion seems to be that costs and net profits run about fifty-fifty, or at the rate of about $4.50 a ton profit. Should such prove to be true, the monthly net profit would approximate $80,000 and it can readily be seen would soon place the treasury in a strong position.

The company is capitalized at $5,000,000 dividend into 500,000 shares of the par value of $10 each. Of this only $4,000,000 or 400,000 shares have so far been issued. Thus in order to disburse dividends at the rate of 20 per cent annually net profits of only $66,666 monthly is all that is required.

There is one feature, of course, which is important, and that is that mill heads will gradually be reduced as milling capacity is increased. It is expected, however, that the smaller margin of profit realized on each ton of lower-grade ore treated, will be compensated for by the larger tonnage being handled, and that, barring labor difficulties, which now appear extremely remote, the Dome Mines Company is once more upon the threshold of success.

The annual report of the McIntyre-Porcupine is being awaited with interest. Although the company's year ended June 30th, the directorate has followed its much criticized policy of withholding the important information for a far greater length of time than is the custom of leading mining companies.

Not a few shareholders are disgruntled over the treatment accorded them by the directorate, and criticism is open and pointed. Just why the report should be held up each year is difficult to understand. The practice offers great benefit to the few insiders who are thus placed in a position to take advantage of either a favorable or an unfavorable report. This year's report is generally believed to be favorable, but no thanks is due to the directorate for the reason that little or nothing of an official nature is given out by President Bickell since his appointment, except that contained in the belated annual statements. The policy is in sharp contrast to the admirable frankness of the past president, the late Col. A. M. Hay.

Unofficial reports indicate that the net profits realized by the McIntyre-Porcupine during the fiscal year ended June 30th last, amounted to not far under $850,000. During the year three dividends, each for five per cent were disbursed, amounting to $541,542.55. This would leave a balance of something like $300,000 to be carried forward to former surplus of $872,172.75.

At the time of writing it has not been possible to secure any information as to the ore reserves as at the close of the company's fiscal year.

Gowganda District—Miller Lake-O'Brien Mine.

Certain misleading statements have recently appeared in certain portions of the press, in connection with the Miller Lake-O'Brien mine, in the Gowganda district.

The Miller Lake-O'Brien is the only producing mine in the Gowganda field, and ranks among the leading silver producing mines in this country. Recently it has been producing at a rate of upwards of one million ounces of silver annually, being about in the class with the Coniagas, O'Brien, and McKinley-Darragh mines in the Cobalt district, but considerably less than the leading mine, the Nipissing which up to the middle of this year was producing at the rate of close to three million ounces annually.

The statement that the Miller Lake-O'Brien has a re-

serve greater than any other "exclusively silver producing mine in the world," is perhaps one that the O'Brien Limited, owners of the mine in question, would not be prepared to make, and it is considered quite probable that the following statement as it appeared in certain parts of the press was inspired in the mind of some one who is not familiar with the actual situation:

"As already intimated, the Miller Lake-O'Brien in Gowganda has more silver in sight than any exclusively silver producing mine in the world, probably as much as 50 per cent of the total now showing at Cobalt. The district is promising if handled by men who know their business.

"The white metal is not nearly so widely distributed as the yellow, and is in fact practically confined to the Western hemisphere. Gowganda seems to have deposits of much greater vertical extension than those of Cobalt, and when the methods of their occurrence are thoroughly understood the camp will be our main reliance for silver."

The foregoing statement was obviously written by some person not very familiar with the subject under discussion, which fact is indicated by reason of the ambiguous construction, as well as the disregard shown for the facts. It would be wrong to belittle the importance of the Miller Lake-O'Brien mine. The property, as stated, ranks among the leading silver mines of this country. At the same time it is contended to be only fair that the owners of the property should be protected from any of the onus which might follow the circulation of unofficial and incorrect statements.

Fort Matachewan District.

A property of considerable merit, about which very little has been said, is that belonging to "Jim" Nelson, one of the oldest prospectors and miners in this country. The property is situated in the Fort Matachewan gold district, and is several miles north from the centre of activity in the latter field.

The surface outcrops on the Nelson claims show andesite and porphyritic formations, in which veins or mineralised dikes occur running north-east and southwest. Very encouraging gold values have been encountered, including some visible gold. A number of men were taken in to the property this week for the purpose of making a more or less thorough exploration of the surface, including the sinking of test pits.

Gold bearing veins have been found to occur on the Indian Reservation near Fort Matachewan on the Great Northern Bend of the Montreal River, and only a few miles north from the gold discoveries which have during the past year or so attracted considerable attention to the Fort Matachewan district.

It is learned that an effort is being made to determine what the government can do in the matter of making the mineral possibilities of the reserve available for exploration. The reservation is about four miles square and is situated partly in Alma and partly in Baden townships. Gold-bearing veins discovered on the Nelson claims in the township of Baden, and former promising finds made in the township of Alma has served to place the Indian Reserve in the heart of a promising prospective area.

The rock formations in the area are somewhat similar and appear to be a continuation of those which occur as far west as the Ontario-Quebec boundary, passing through Kirkland Lake, Boston Creek, Skead, Larder Lake, etc., and offers an attractive field for the prospectors.

At a depth of 170 feet on the Matachewan Gold Mines (formerly the Otisse), lateral work is being carried on with favorable results. Drifting operations are being carried on in two directions, while crosscutting is also under way.

It is planned to proceed with development work on a comprehensive scale until winter at which time a fair estimate can be made with regard to additions to the mining plant. T. J. Flynn, manager of the mine, came out a few days ago, and is quite optimistic over the outlook.

On Right, T. J. Flynn, Manager, Matachewan Gold Mine.

Kirkland-Lake.

In connection with the merging of the Tough-Oakes Gold Mines with the Burnside, Aladdin, Sudbury Syndicate and Sylvanite, certain portions of the English press has offered more or less serious criticism. The chief objection presented is in connection with the capitalization. In connection with this the "Financial Times," England, states that it is not so much concerned about the terms of the merger as "with the capitalization of the consolidation at a million sterling, with nearly £800,000 in issue to start with and with what we consider to be the slender basis for this valuation." Continuing this criticism, it is pointed out that after reading the official summary of Lieut.-Col. H. H. Johnson,

the conclusion is reached that: "This engineer provides more in the way of prognostications than positive data of value." Further: "There is nothing whatever to show in the summary we are referring to that the consolidated properties will yield a reasonable profit. That remains to be demonstrated. We are told developments 'should' do this thing or the other, that its situation gives one property 'unique possibilities', and so on; but when it comes to facts, we find that the one mine on which there has been a fair amount of development now has 'only a small tonnage of ore reserves in sight," while on the other two Kirkland properties little actual development has been done."

Concerning this, H. G. Latilla, the chairman of the extraordinary general meeting of the Kirkland Lake Proprietary, Ltd., held in London on July 16th, declared that he welcomed criticism, and that instead of the capitalization being unreasonable, it was just the opposite, in that should the merger be completed along the proposed lines it would in reality effect a reduction of about £1,200,000.

Concerning the foregoing, the writer is familiar with the position of the Tough-Oakes Gold Mines, particularly in relation to the present physical condition of the mine. Criticism as to its weak position is quite unfair, for the reason that during the prolonged litigation in which the mine was involved those in charge appear to have devoted their energies toward producing the gold in sight with very little regard for developing in advance the continuation of these deposits or exploring for new ones. In justice to the criticism, however, it must be admitted that it is intelligent, and, therefore, no doubt sincere. The only objection is that in view of the peculiar situation at the mine, the term 'prognostications' appears to be out of place owing to the fact that ore reserves are low, due entirely to the policy of the former control to mine ore accordingly as it was developed. It has been demonstrated that development work has always resulted in bringing ore into sight with remarkable rapidity at the Tough-Oakes, and that there has been no developments that would even indicate that the limit of these deposits have been reached. To the contrary there would appear to be very probability, without making unreasonable prognostications, that a very considerable period of productivity lies ahead. As to whether or not the future will result in the realisation of a reasonable profit on a capitalization of a million sterling is a question of course that only the future can decide, but in the meantime there would appear to be reasons for being quite optimistic over the outlook.

Among the new companies operating in the Kirkland Lake field is the Granby-Kirkland Gold Mines. The company has two claims comprising approximately 85 acres, situated in the township of Lebel about one mile north-east from the Tough-Oakes mine, and a little north from Gull Lake.

Up to the present time about 300 or 400 feet of surface trenching has been done, during the course of which three very promising veins have been opened up at outcrop. These veins vary in width from three to upwards of five feet. On the main or No. 1 vein which is about five feet six inches in width, a shaft has been started and has reached a depth of about twelve feet, at which point the vein shows a tendency to widen. The veins stated to occur in the contact between conglomerate and porphyry formation, and is composed of quartz and altered rock, all of which is highly mineralised. What appears to be lead-telluride occurs in some of the vein filling, an analysis of which is to be made this week. A mud-seam also occurs in the vein.

It is understood the plan of the management is to continue surface exploration during the present favorable weather after which sinking operations will be proceeded with. The company is capitalised at $2,000,000 divided into 2,000,000 of the par value of $1 each. E. Croteau is in charge of the work.

Very satisfactory progress is being made in constructing the macadam road from Swastika to Kirkland Lake. As yet the work has been carried on largely on the western end, adjacent to the railway. A start has also been made on that part which passes over the Kirkland Lake Gold Mines.

As near as can be learned, it would appear probable that the east end may be left over until another year for completion, the present indications being that the first four miles or so will be about all that may be completed this year. This would take in all the mines as far west as the Wright-Hargreaves.

A gold discovery made on a group of claims situated in the township of Bernhardt, in the Kirkland Lake district is attracting considerable attention. The find was made on claim number 6075, being one of a group owned by K. Ayoub of Cobalt.

The rock formation on the claims referred to is stated to consist of keewatin, basalt, porphyry and diabase, in which a vein has been opened up showing a width of from six to eight feet, composed of sugar quartz and schist and containing visible gold. The claims are situated in the southern part of the township of Bernhardt, and on the west side of Amikougami Lake. They have been held for about four years by the present owner, the assessment work having been completed this summer.

Boston Creek.

With the near approach of fall which will draw to a close one of the finest summers in Northern Ontario's history, comes the information that representatives of the provincial government are looking into the matter of offering assistance in the building of a road through the Boston Creek district to the Skead area. As far as the Skead area is concerned, a winter road will be of considerable assistance, and should be built. In the matter of the Boston Creek road, however, the time has arrived when it is found necessary to haul a large amount of equipment without waiting for snow roads, and the belated move of the government is less than had been expected.

It is true that the burdens of the Department are heavy, but no matter to what extent this holds good it is essential that the road-building programme should be guided by the merits of the case. No other mining area bearing anything like equal promise to that of Boston Creek has been left to paddle its own canoe. At least not by any of the party governments which have held power in this province during recent time.

Quite a number of prospectors have left for the scene of the reported gold discovery in The Pas district, Northern Manitoba. According to reports from the north some seventy or eighty prospectors are reported to have left the Porcupine district for the purpose of visiting the reported discoveries, and, if considered advisable, staking claims in the vicinity of the finds.

Matachewan Gold Mine, N. Ont.

The Hollinger Mine.

Matachewan Gold Mine, N. Ont.

According to unofficial information, it is learned that interests of Bedford, N Y., have acquired the property of the Hill Gold Mines, in the Painkiller Lake district, and that the property will be worked under a new name, probably the Beattie Gold Mines.

According to advice just to hand, the Crown Reserve Mining Company has purchased two mining claims in the Larder Lake gold area. The two claims are part of a group of thirteen owned by N. N. Maloof, of Haileybury, and are situated about a little less than half way between the Harris Maxwell, one and a half miles northeast from the Harris-Maxwell and the Kerr-Addison. The claims in question were originally staked by Eli Tripp. Work carried on has uncovered some very promising showings. A highly mineralized porphyry dike which has been uncovered on the two claims just sold, has also been traced over a portion of the group still retained by Maloof.

In the Maple Mountain section of the Elk Lake district a good deal of inconvenience is being caused by the lack of satisfactory transportation facilities. During the past several years a considerable amount of exploration and development work has been done on the White Reserve property and a substantial amount of silver ore has been opened up. This is another district where the government could be of assistance.

Cobalt Strike Situation.

The deadlock in the labor situation at Cobalt continues. After one of the most sincere and unbiased efforts on record, a committee of returned soldiers acting as a neutral body, have failed to find a solution to the labor strike. This committee, after approaching the Cobalt Miners' Union with the suggestion that a ballot be cast on the question of whether or not the men favored a return to work on conditions which existed before the strike was called, which suggestions were rejected, approached the Mine Managers of Cobalt, who granted them a hearing and even went so far as to concede to the request that a system of collective bargaining be agreed upon, and that all employes be taken back without discrimination accordingly as positions should be available. These concessions, presented by the Temiskaming Mine Managers' Association to the Committee of Returned Men, were placed before the workers of Cobalt together with the request that each man, union and non-union, should record his vote as to whether or not he favored the proposition. The matter was placed before the workers without recommendation or otherwise. Regardless of the fact that the workers were asked to vote either for or against the matter of returning to work, or remaining on strike, the executive of the Union ordered the members of that organization to not cast their ballot, under penalty of being expelled from the union. As a consequence of this the ballot taken is scarcely representative of all the workers of Cobalt.

The executive of the Cobalt Miners' Union declare that they recommended to their members that the matter be voted upon, but that the members refused to support the recommendation. This is construed as constituting a lack of confidence in the judgment of the executive.

Owing to the failure of the Returned Soldiers' Committee to find a solution, the strike continues. The situation now is this: The Cobalt Miners' Union oppose the interference of a neutral organization. The Temiskaming Mine Managers' Association refuse to recognize or deal with the Cobalt Miners' Union. Thus, as a consequence of neutral influence or effort being of no avail, the gulf has broadened.

To the neutral observer, the situation presents every indication of being a more or less tame affair for some considerable time to come, in that with the union defying its members to vote on any proposal put forward by neutral bodies, and the mine managers refusing to recognize the union, there would appear to be nolikelihood of a solution being found or even suggested under the present circumstance.

The false impression has gone abroad in badly informed circles that the Returned Soldiers' Committee was endeavoring to break the strike. As far as can be seen, just the opposite has been the case. For instance, in presenting their proposal for the expression of opinion as to whether or not the workers of Cobalt would return to work under a system of collective bargaining, the Committee appears to have refrained entirely from making any recommendations for or against the plan, and presented it as a neutral body, even carrying their neutrality to the point of actually not casting their own ballot on the question, although, as workers in the closed mines and plants, they were legitimately entitled to record their votes. The workers and the business men of Cobalt would appear to be indebted to the Returned Soldiers' Committee for their commendable endeavor to secure an unbiased and representative expression of opinion of all the employes affected in the present labor strike, despite the fact that success has been denied them.

Company Incorporated to Aid Prospecting.

A new company, known as the Prospectors' Development Company, Limited, has been incorporated, which plans the organized development of promising mining properties in Northern Ontario. The company is capitalized at $2,000,000 divided into $1 shares. There has been no promotion stock issued, the entire stock remaining in the treasury. The scheme is the first of its kind to be undertaken in this country and may reasonably be expected to enlist a good deal of support. The incorporators are men of good reputation in the mining field, the following gentlemen being identified with the enterprise: John B. Holden, of Toronto, Harry Oakes, president of the Lake Shore Mine; H. H. Johnson, of the Tough-Oakes; Wm. Wright, original owner of the Wright-Hargreaves' mine; Mr. Bain, of Bicknell, Bain, McDonald & Gordon, and others, which gives assurance of integrity.

The plan is to have prospectors register their holdings with the company, and, if the property possesses merit the holders are to be paid a limited amount of stock in the company, which will carry out the necessary assessment work obligations and receive a small percentage in each claim for each instalment of work paid for. It is planned to carry properties through the prospecting stage and make it possible for the prospectors to still be interested in the mines that may result from work done, instead of, as has been usual, the prospector not getting his full measure of reward in cases where he has been the discoverer of large mines.

West Shining Tree District.

A large amount of diamond drill work is to be done in the West Shining Tree district this year. Although Mr. Hore's recent report on the district marked it as one of more or less uncertainty, but presenting considerable possibilities, the feeling exists that there are

a number of mineralized bodies which should be comprehensively explored.

Not a few conservative mining men have shunned the camp for the reason that it has been boomed by brokers. Conservative newspapers throughout the country have advised caution with regard to dealing in shares of companied operating in that district. The promoters have endeavored to put the public off its guard by charging that certain newspaper correspondents were knocking the camp itself. At the present time, after consulting the opinion of recognized authorities, it may be stated that the West Shining Tree district has some prospective merit. The pay-streaks, of course, are narrow, and the development of the various properties is still a gamble, but all new mining camps must first pass through this stage. At the same time, the necessity for advising caution on the part of the public is stronger than ever, for the reason that when mining engineers or geologists make a report on property they consider only the mineral deposit and not the methods of financing. The would-be speculator should always learn approximately what amount of money received for stock is actually going into the treasury and how much is being raked off by the promoters.

WASAPIKA CUTS VEIN AT 100 FT.

Development work at the Wasapika gold mine is progressing favorably. A cross-cut is being driven at the 100 ft. level from the shaft towards the Ribble vein. This cross-cut has just entered the vein and the indications are that the vein will prove to be very wide. Nearly 9 ft. of quartz has been broken and the face is still in quartz. The quartz is well mineralized.

Herrick Drill in Operation.

Diamond drilling has begun at the Herrick gold mine, Wasapika gold area. It is planned to thoroughly explore the Herrick vein by drilling preliminary to development by shafts and drifts. The shaft is in good ore for 50 ft. and the drilling will give some idea of the nature of the deposit at depth.

West Tree Shaft in Rich Ore.

Sinking of a shaft on the West Tree property on the west shore of Upper Wasapika lake is proceeding rapidly. Some very rich ore is being taken from the shaft.

Across the lake there is a shaft from which rich ore was taken 3 years ago. It is planned to drift across the lake towards this old shaft from the western shaft.

BRITISH COLUMBIA.

Mine Safety and First Aid Competition, Nanaimo, B.C., Sept. 1st.

The Vancouver Island Mine-Safety Association will hold its fourth annual field day, mine-rescue and first-aid competition on Labor Day, September 1st, at Nanaimo, B. C.

The programme will include mine-rescue competition, which is open to the mining world, for the Vancouver Island Mine Safety Association shield and first and second prizes; first-aid competition, team event open to the mining world, first and second prizes; B. C. Department of Mines cup, first and second prizes; W. L. Coulson cup, first and second prizes; V. I. M. S. A. Juvenile cup, sixteen years and under, first and second prizes; two-man event, first and second prizes. One man event, first and second prizes. Teams are expected from Nicola Valley, Eastern B. C., the State of Washington and from all the mining centres of Vancouver Island.

The "Journal" has arranged for a full report of the competitions by its regular correspondent.

Mining Exhibit at Vancouver Annual Exhibition Creating Great Interest.

When the Vancouver Exhibition Association's 1919 Exhibition is opened by Sir Arthur Currie, one of the great attractions will be the exhibit of British Columbia minerals and mining machinery.

The B. C. Chamber of Mines, working in conjunction with the Exhibition Association have arranged for an exhibit, which will display the wealth of British Columbia's mineral resources on a scale never before attempted, and which is sure to draw a great deal of public attention. New samples are coming in continually, and the arrangement of the different minerals will be attractive and with the idea of showing each variety in the best possible manner.

The supply and equipment firms are taking hold in a manner which shows their interest in the exhibit. There will be a concentration plant, a flotation plant, water wheel, and assay furnace all in actual operation, and actual workings of drills, etc. This will make the allied exhibit of much interest to all visitors.

The mining exhibit this year will be of special value, as there will be hundreds of visitors to the exhibition who are touring the Northwest in autos, and they are planning to be at the exhibition during Exhibition Week, this means direct advertising of British Columbia's natural resources.

CONSOLIDATED MINING & SMELTING COMPANY PURCHASE GOLD PROPERTIES NEAR GOUDREAU.

It is reported from Sault Ste. Marie that the Consolidated Mining and Smelting Company of Canada interests have purchased a portion of the Webb-McCarthy-Miller gold properties near Goudreau, the deal involving $400,000.

The holdings acquired by the Trail people include six claims situated three miles east from Goudreau, but Sault men interested have other holdings in the district including three claims of McCarthy and Webb on one side and three other claims of Miller and Huckson on the other.

The conditions of the deal, it is understood, including the construction of a $500,000 plant by the purchasers.

New Interests.

The properties have been gone over twice by J. K. Cram, representing the company, who found the tonnage and general average very satisfactory. They purpose putting in a spur from Goudreau and to start diamond drilling within forty days from date of purchase. Smith and Travers, Sudbury, have contracted for the drilling. The company is arranging for electric power from the Michipicoten Power Company at Michipicoten River.

While results of the assays taken on the property cannot be secured owing to the absence of Mr. Cram, the syndicate which has just disposed of the claim say they are as high if not higher than anything yet found in northern Ontario and that there is ample tonnage in sight to make the development one of the most interesting features of mining the north has ever experienced.

NOVA SCOTIA NOTES.

Nova Scotia Steel & Coal Co.

The N. S. S. & C. Co. has commenced operations on the Stubbert Seam, near Point Aconi, about six miles from Sydney Mines. It is understood the company has in view a continuation of its existing railroad system from the Scotia Colliery, distant about four miles, which will necessitate a bridge across the Little Bras d'Or. It is understood that it is considered preferable to take the coal from the new Stubbert Mine direct from the Point Aconi district to Sydney Mines, rather than commence any minor shipping operation at or near the Bras d'Or.

The production of the Scotia collieries in July compared with July, 1918, as follows:

	July, 1919.	July, 1918.
Princess	13,141	12,161
Florence	16,153	14,306
Scotia	4,797	7,560
Jubilee	6,237	12,191
	40,328	46,218

The outlook for August is said to be much improved, and it is probable that the collieries will work almost full time during this month.

About half the regular working force at the Steel Plant is engaged on repairs, but all the productive operations are suspended.

Dominion Coal Company.

Work at the collieries has been lessened by the suspension of producing operations at the Sydney Plant, and the smaller tonnage of coke required.

The new shaft to the Phalen Seam, situated between No. 1 and No. 2 Collieries is progressing rapidly, and the excavation is now below the Harbour Seam.

The Limestone quarries of the Dominion Steel Company in Newfoundland produced 47,702 tons in July against 45,648 tons in July, 1918. The limestone quarries at Marble Mountain in Cape Breton in July showed an output of 51,176 tons comparing with 46,740 tons in this month last year.

At Wabana, the iron-ore output in July was 68,914 tons. Last July it was 50,933 tons. The production of all the departments of the Mines & Quarries of the Dominion Steel Company was therefore greater in July, but it may be anticipated that the slackening of operations at Sydney will necessitate some reduction in production of raw materials, although it may be expected that this will be brought about rather by a curtailment of the shipping season and an earlier suspension of production as winter approaches, rather than by restriction of output at the moment.

War Loan Savings.

The Maritime Mining Record says:

While quite a number of young miners sold their war bonds, there are many of the married men who deeply regret that the war loan system of saving has passed away. These men openly state that but for the war bond they could never have saved any money. Now that they have a few hundred dollars they would like to have more, but they are convinced that there is only one wa yof getting it and that is the system of payment through the coal companies.

Those who have been able to hold on to their Victory Loan bonds have had reason to be satisfied from a purely monetary standpoint, seeing that the bonds are now quoted at a good premium and are likely to appreciate still further. It has been particularly pleasing to those who have purchased their bonds through the instalment plan on the scheme made possible by some of the coal companies to receive full interest on the June coupon, without any deduction for interest by the company that in the first instance purchased the bonds for its employees. The Scotia Company adopted this plan, and it has been the occasion of much gratification to its employees.

Unfortunately, as the "Maritime Mining Record" states, some of the younger men, and some who unfortunately could not help themselves, sold their bonds, and in some instances there is no doubt that they were taken advantage of by persons who gave them par for bonds that were quoted at 104 and 105.

The "war loan system of saving" has not passed away, however, as another loan is shortly to be asked by the Government. If the coal companies assist their workpeople to buy the new loan, in the same way that they did in the case of the previous loans, equal success will be achieved, allowing, of course, for any depressed trade condition that may exist when the loan is floated.

Working Hours.

As bearing on the determination of the United Mine Workers to enforce a seven-hour day, it is significant to note that the Tenessee Coal, Iron & Railway Company's mines have gone back to a ten-hour day, with time and a half for all time over eight hours, and that on August first this move was followed by the mines of the Republic Iron & Steel Company. The eight-hour day which has been in force since April has proved a decided failure. The longer day is expected to mean a considerable increase in wages, and already a large increase in tonnage has been noted.

That a similar procedure may be experienced in Cape Breton is indicated by the Maritime "Mining Record," which says with reference to the five day week:

"There are many others against the five day week system than President Workman. Some U. M. W. locals protested against it, while many members of most locals are loudly declaiming it. These men openly state that they were led to believe that five days per week meant six days pay, or they would have voted against instead of for. Nearly all daymen say that it does not suit them, and miners and contract men receiving a bonus for steady work want none of it, for they stand to lose from twenty to fifty dollars per month. These men are 'saying things' now and when the loss hits them things will be 'doing' around the collieries. That such a vital question could be so darkly initiated is beginning to arouse the suspicions of the thinking class of the workmen who are beginning to realize that there are others besides politicians who win elections on promises."

The Dominion Coal Company has obtained redelivery of the S.S. "Kamouraska" from Admiralty requisition. With the "Lord Strathcona" also recently released, this company should be in a much improved shipping condition.

About fifteen to twenty years ago, the Dominion Coal Company formed sales conections in Norway, and some coal was shipped there from the Cape Breton collieries. It is announced that recently the Furness Withy people shipped 3,000 tons of Cape Breton coal

to Norway by the "Bratland," and that a further order for 10,000 tons has been received at the mines. Two steamers, "Brad" and "Mons" are due at Sydney about Sept. 1st for further cargoes for Norway. In this instance Cape Breton coal is being substituted for English coal.

It is significant of the reversal of trade conditions brought about by the war that Cape Breton coal can be shipped to Norway and sold in competition with English coal—or rather in default of English coal—and that Cape Breton coal cannot compete with United States coal in the Montreal market.

A VAIN PETITION.

The most arresting article in a late issue of the Springhill paper was a letter of a correspondent. Here is the letter, unnecessary words omitted. "I am a church member and member of a labor union. I try to be consistent. I attended prayer meeting the other evening and was called on to pray. Among my supplications I humbly asked that in view of the fact that a majority of the workers were day laborers, and in all probability would be reduced to five days a week that God work on the hearts of our statesmen to do something to reduce the high cost of living. At this point a man in the audience got up and said he could not listen to such talk. He told me I was no friend of labor. Said he: "How can the Lord reduce the high cost of living without reducing wages.'" And we too, not facetiously not lightly, but, in all honesty ask "How can He?" — Maritime Mining Record.

LARGE COAL EXPORT ORDER.

Philadelphia.—It is reported that a New York firm has been successful in placing with Pocahontas operators a contract for 500,000 tons of coal a year, for three years, or a total of 1,500,000 tons, for export to Great Britain.

Assurance was given that bottoms for transatlantic shipment would be available, and the entire contract is reported to have been at a fixed price. Export coal of this high grade is commanding $1 to $1.50 premium over the domestic price and it is assumed that this would be attractive to Pocahontas region shippers in a long-term contract such as the present instance.

WORLD'S DEEPEST OIL WELLS.

Of four deepest oil wells in the world, two are in West Virginia, one in southwestern Pennsylvania and the other in Germany. Deepest well is the J. H. Lake, of the Hope Natural Gas Co., which was abandoned at 7579 feet.

Second deepest well is the M. O. Goff drilled 7386 feet, about eight miles northeast of Clarksburg, W. Va., also by the Hope Natural Gas Co. Third deepest is at Czuchow, Germany, and is 7348 feet deep. Fourth is the R. A. Geary, drilled to a depth of 7248 feet, in southwestern Pennsylvania, by the People's Natural Gas Co., according to the United States Geological Survey.

In comparison with these depths, other depths reached by wells or mines are insignificant. Depest mine in the world, for instance, is shaft No. C of the Tamarack mine in Houghton county, Michigan, which has a depth of 5200 feet.—Boston News Bureau.

HOLLINGER CONSOLIDATED GOLD MINES, LIMITED. INTERIM REPORT, 1st JAN. —17th JUNE, 1919.

The Interim Report of the Hollinger Company covering the 6 four-weekly periods from 1st January to 17th June, shows income and disposals as follows:

Income	$3,166,625	
Expenditure	1,646,868	
		$1,519,757
Dividends		738,000
Added to Surplus		$781,757

Current assets, plus bullion assets, total $3,346,575, which less current liabilities, leaves a surplus of $2,-853,043.

The number of persons employed totalled 1,344 at 17th June against 1,311 at March 25th, an interesting feature being the slight decrease in the non-productive

A Quartz Outcrop of the Hollinger Property.

force and an increase of 40 men in the mining class. The number of miners obtainable is understood to be less than could be employed, but the labor troubles in the Cobalt and Kirkland Lake camps have helped the situation to some extent.

The mill ran 69 per cent of the possible running time, treating 316,386 tons of which 50,477 tons came from development. The average value of the ore treated was $9.93 per ton. Cost of treatment totalled $4,95 per ton.

An Unusual View of the Hollinger.

We believe the world will better know how to behave itself and keep the peace when it has learned that imports are the only international currency that pays for exports and that all schemes to blink, dodge or sidestep this fact can lead only to dispute and conflict. Trade is barter, money is but a poker chip, and the thought of money as wealth in itself gives life to the old proverb: "The love of money is the root of all evil."—Stephen Bell, in "Commerce and Finance."

THE REPORT OF SIR ARTHUR DUCKHAM MINORITY REPORT OF THE BRITISH COAL COMMISSION.

Asquisition of Mineral Rights.

The whole of the mineral rights of Great Britain should be acquired by the State, the value of such rights being estimated in each case on the same basis as adopted by the Inland Revenue in assessing ownership of minerals for death duties (the evidence of the witnesses from the Inland Revenue Department clearly shows the principles), due regard being given to the change in value of money owing to the war, increased taxation (with the exception of the Excess Mineral Rights Duty), etc. No increased value should be given in cases where it can be shown that mineral owners have used improper pressure to obtain royalties above those commonly obtained or in the case of sliding scale royalties which have become excessive through war conditions. Compensation should preferably be paid in the form of annuities, as suggested in Mr. Walter Leaf's evidence.

Ministry of Mines.

A Ministry of Mines should be set up, which should, at a later date, form one of a group of Ministries attached to a Ministry of Industry. The duties of the Ministry of Mines should be (inter alia)—

(a) To supervise and control all mineral rights throughout Great Britain and to ensure the proper working of all minerals.

(b) To ensure the making of a complete geological survey (including the systematic proving of all coal areas) of the whole country.

(c) To be responsible, through its inspectors, for the proper equipment and running of mines to ensure safety.

(d) To initiate and, if necessary, carry out research for the improvement in the conditions of those working in and about mines, better methods of winning coal, etc.

(e) To undertake the study of the special diseases of underground workers and to initiate special treatment.

(f) To exercise any control of the industry which a national emergency may render necessary.

(g) To advise the Minister of Labor as to the special conditions present in the coal industry.

(h) To co-operate with any Government Department set up for the conservation of fuel.

Area Commission.

A Commission assisted by experts acquainted with the various districts should at once be set up to decide the areas into which the country should be divided (all mining interests in each of such areas being amalgamated) in order to obtain the best economies and efficiencies in the winning and working of coal. The areas should not be larger than necessary to ensure:—

(a) The most efficient draining and pumping for the whole area.

(b) The most rapid transport of the coal to the surface and the miner to his work.

(c) The obtaining and distribution of power from one centre.

(d) The prevention of waste of coal by artificial barriers, etc.

(e) The proper handling of the various classes of coal produced in the area.

Unification.

It is essential that all the colliery interests in the areas specified should be amalgamated in order to obtain proper working. The amalgamated interests would be granted a lease by the Crown to work coal and other necessary minerals.

Method of Unification.

It is possible to prepare a variety of schemes to attain the primary object of unification in areas, but the following proposals are made to illustrate the intention. The proposals assume the discontinuance of the present system of control.

The whole of the mining interests in each area should be amalgamated into a Statutory Company (hereinafter called "a District Coal Board.")

(a) The total par value of the shares issued by any Board shall not be greater than the total value of the various amalgamated interests as going concerns at the present time, but valued at 1914 prices, due allowance being made for capital expenditure since that date at enhanced prices.

(b) The shares of the District Coal Board should be of one class only and should be entitled to a minimum rate of dividend of 4 per cent which should be guaranteed by the Government.

(c) Profits in excess of those necessary to pay the 4 per cent dividend and usual depreciations may be utilized—(i.) to form such reserve funds as may be approved by the Minister of Mines. (ii.) To pay a further 2 per cent dividend.

Of the remaining profits one-third may be utilized for paying further dividend on shares, but the other two-thirds must be used to reduce the price of coal.

The above proposals for the division of profits do not preclude a bonus on profits being paid to the managerial and clerical staff. This would correspond to the bonus in output proposed below for the manual workers.

Government Right to Take Over a District Coal Board.

The Government shall have the right to take over the shares of any District Board, should the Board have called upon the Government in four years out of a consecutive seven years to make advances to pay the guaranteed dividend and the Board failed to repay within seven years any advances made. The compensation to be paid by the Government for the shares so acquired should be based upon the profits earned by the undertaking during such seven years.

Board of Directors.

The number of directors on each Board should be not less than seven. All except three of the directors should be appointed in the ordinary way by the shareholders. Of such three directors, one should be elected by ballots of the agents, managers and undermanagers, and two by ballot of the workpeople engaged in the area.

Government Representative.

The Government, as owner of all minerals in the area, should appoint a competent mining engineer to safeguard the interests of the State. He should have the right to attend directors' meetings when he desires to do so, but should have no voting power.

Agents, Managers, and Undermanagers Representatives.

The agents, managers, and undermanagers have and will continue to have legal obligation for the proper and safe running of mines. They, therefore, should be represented on the Board of Directors. Their expert advice would be invaluable.

Workmen's Representatives.

Labor has a special claim for representation in the directorate as wages form the predominant item in the cost of production and the conditions of the industry are necessarily hazardous. The other directors would benefit greatly by having actual workers on the Board with a close knowledge of conditions, and the workmen would have a definite voice in the conduct of the industry.

Minimum or Standard Wages.

The minimum or standard wages for mine workers should be considered and settled together with the general wages of the country. Whichever machinery may be set up by the Minister of Labor for this purpose should be utilized.

Committee For Settling Rates and Wages.

Special rates and wages should be settled for the area of each District Board. The basis should be the agreements at present in force which have been arrived at after years of experience. Conciliation Boards on similar lines to those now existing shall deal with special wages and disputes.

Payment by Results.

The wages of all workpeople and employees should be guaranteed by minimum or standard rates. An equitable system of payment on increased output and efficiency should be arranged and made applicable as far as possible, to all manual workers in addition to the system of piece-work rates at present in force.

Associated Undertakings.

Where a colliery undertaking is attached to other industrial undertakings, such as iron, steel-works, by-product ovens, etc., the value of the colliery undertaking should be separated and included in the holding of the District Coal Board. The colliery should then be leased back to the original owners, who would have the right to raise and use all coal necessary for their own purposes, but they should have no powers to sell coal as such except through the District Coal Board.

Pit Committees.

At each colliery a pit committee should be set up with the manager as chairman and representatives of each main class of workmen employed in or about the mine. The pit committees should meet at definite intervals and would be competent to discuss and make proposals on:—

(a) Safety of the mine;
(b) Conditions of working;
(c) Improvement in methods;
(d) Comfort and well-being of the workers while in the mine or colliery premises;
(e) Any disputes that may arise other than wages disputes.

Wages would not be discussed at pit committee meetings.

Multiple Shifts.

The general extension of multiple shifts, as the most ready means of increasing output, reducing costs, and improving wages to the workpeople as a whole, should be immediately considered by a joint committee of the Government, owners, and miners.

Coal Traffic.

The question of the economy of coal traffic and private ownership of wagons should be dealt with by the Minister of Ways and Communications in conjunction with the Minister of Mines. The interests of the consumer must be safeguarded, and the consumer must be given free choice of fuel to ensure proper economy in its utilization.

Publicity.

It is essential that there should be complete publicity as to the operations and financial results of the coal industry. The Ministry of Mines should be expressly charged with the duty of publishing, not less than once a year, figures showing the cost of getting coal in each of the districts of the country, and the proportion chargeable to materials, wages, general expenses, interest, profits, and other general items.

SUB-AQUEOUS PROSPECTING.

In an interview with the Victoria "Daily Times," Mr. Vaughan M. Lavery, of Le Pas, Man., recently returned from overseas service in a tunnelling unit, suggested that in course of time prospecting in Northern Manitoba would be done with the aid of diving equipment. The country is of the "rocky lake" type, and in many instances the rock exposure which is being following by prospectors disappears under the waters of a lake.

Apropos of Mr. Lavery's suggestion, readers of the "Journal" may be interested in the accompanying photograph of the bottom of the Kerr Lake, snapped by Mr. R. E. Hore a month ago. Fine crops of oats and potatoes were growing on the ancient mud bottom, which has dried out in fine laminations that in section looks not unlike the so-called "paper shales."

An interesting feature of the lake bottom is the glaciated silver-bearing rocks, showing the glacial marks in a surprisingly preserved condition. In some

The Bottom of Kerr Lake.

instances the native silver had been "plated" on the surface of the rocks by the weight and slow movement of the overlying glacial mass.

Mr. Lavery's future prospector will probably be able, in his sub-aqueous geological investigations, to dispense with the old-fashioned diving-apparatus that requires an air-pump and a breathing-tube communicating with the surface of the water, and will be equipped with the self-contained compressed-oxygen diving-helmet, and be thus enabled to "fossick around" at will in shallow lakes.

Incidentally, Mr. Lavery considers that in ten years time the Northern Manitoba district may be the richest mining area in North America.

See our exhibit at the Fifth National Exposition of Chemical Industries Coliseum and First Regiment Armory, Chicago, week of September 22.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS.

Chicago Meeting.

In view of the large number of coal mines centered about Chicago, it is planned to make the Chicago meeting, to be held at the Congress Hotel, September 22-26th, of special interest to the coal industry. A large proportion of the 150 technical papers prepared for discussion will be on subjects related to coal, coal mining and coke. Among these is a carefully prepared symposium on sulphur in coal. Excursions have been arranged during the meeting that will be particularly attractive to the coal man; on Thursday the trip to LaSalle will include the inspection of operating coal mines in the district, and late Thursday night a party will leave for the mines in Franklin and McCoupin Counties, where some novel and ingenious ideas in plant design and methods of operation have been adopted and proven practicable. The trip to the Gary Steel Mills on Tuesday will include an inspection of the immense coke ovens and by-product plant.

Metallurgists and electrical engineers will be much interested in the demonstration to be made of the production of metallic tungsten and molybdenum at the plant of the Fansteel Products Company, North Chicago, on Tuesday, September 26th. As a part of the programme for the Chicago meeting, an excursion has been arranged to Milwaukee, to visit the various mining machinery plants in the vicinity, and a stop will be made en route at the Fansteel plant. The entire metallurgical process will be shown, from the preparation and purification of the commercial concentrates, and including sintering the pulvurent metal obtained into homogeneous billets by the use of currents of enormously high amperage.

The National Exhibition of Chemical Industries is being held at the Coliseum, Chicago, the same week as the Institute Meeting. Members of the Institute have been extended an invitation to attend this exhibition.

THE "CANADIAN MINING JOURNAL" IN CHICAGO.

The Canadian Mining Journal, and the other technical periodicals published by the Industrial & Educational Press at Ste. Anne's will be "at home" in Booth 138 at the National Exposition of Chemical Industries from the 22nd to 28th September in Chicago.

Mr. H. W. Thompson, the western advertising manager of the "Journal," with his assistants, will have charge of the booth.

A cordial invitation is extended to all friends and readers of the "Journal" to make themselves at home.

The other magazines of the Industrial & Educational Press, which will be represented are "Pulp & Paper Magazine of Canada," "Canadian Textile Journal," "Canadian Fisherman" and "Iron & Steel of Canada."

Isn't it a fact that most people have a sneaking admiration for the action of the German Admiral in scuttling his ships at Scapa Flow. And suppose — something that is unthinkable — that British ships should have been placed in a similar position, would not they have found the bottom? The incident occurred because the British Navy, for political reasons, were appointed guardians for the Allies, but not given the right to post a guard on the German ships. The Germans "put one over" on the Allies, but did not the laxity of the Allies invite the incident?

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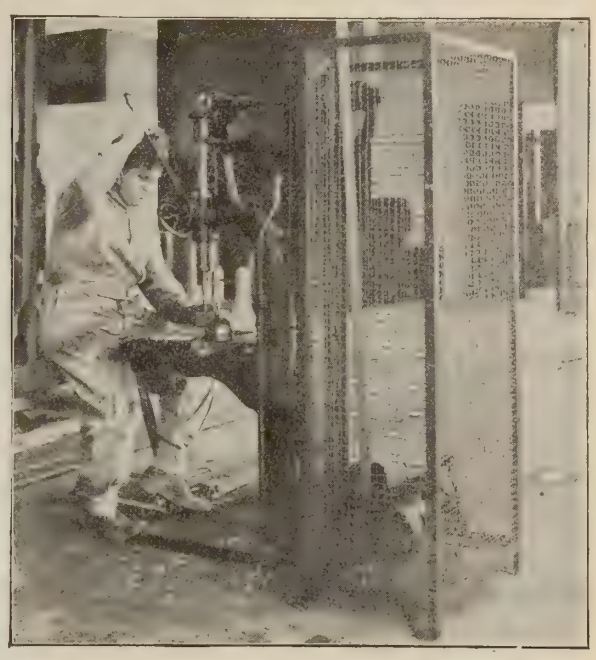

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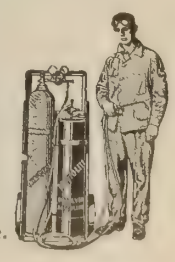

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PRINCE OF WALES VISITS HIS MINES IN THE DUCHY OF CORNWALL.

Previous issues of "Mine & Quarry" have described the great interest which Cornish mining men have taken during the past two years in the introduction of Sullivan diamond core-drills for prospecting in the mines of Cornwall. The accompanying photograph was taken on the occasion of a visit of the Prince of Wales, who is also the Duke of Cornwall and Devonshire, to the Kit Hill Mine in June, 1919. The "Western Morning News" of June 11th says, "Because of the enterprise of the Duchy management in installing up-to-date machinery, these mines are providing valuable quantities of tin and wolfram, the supplies of the latter having proved of great national service during the war. The Prince showed a decided aptitude for making the most of his time, and was shown, what is a novelty in Cornwall, the new Sullivan diamond-drill, which began its work of boring on May 28th. This drill bores out a core of rock about one inch in diameter, from which can be learnt the properties of the lode, the object of the drill being for prospecting. It has already bored about 120 feet, the average being about 12 feet per day (horizontal holes in single shifts) and its ultimate depth will be over 700 feet. The Prince spent some time watching the drill at work and displayed a very keen interest asking many questions relative to the working of the drill. Specimens of metal which had been extracted by the drill were also shown him."

The Prince in the photograph is shown close to the swivel-head, watching the machine work.

Mr. W. H. Seaman, Jr., has accepted a position with the Matachewan Gold Mines. His address is Elk Lake, Ont.

Prince of Wales in Cornish Tin Mine

:-: EDITORIAL :-:

THE PRINCE OF WALES.

Racey, the clever cartoonist of the "Montreal Star" expressed a happy symbolism when he recently portrayed Canada as a smiling maid disclosing the treasures of our Dominion to our visiting Prince.

Youth will be served, and youth has a spontaneous companionship with youth that is denied to those of maturer years. The youth of Canada has been to the wars, young maidens as well as young men, and the Prince was there too. In this fact lies a bond that ensures the Prince a royal progress throughout Canada, such as the Dominion has never seen before.

The Prince of Wales comes to us smiling and debonair, speaking both the tongues of our country, at the victorious conclusion of a bitter war in which Canada did what her people conceived to be their duty, and from which the Canadian people has emerged a nation acknowledged as valorous and as one of the League of Nations.

Surely the signs are propitious that bring this young Prince at this time to a people that has been stirred to its depths by the wounds it has suffered in a war in which it voluntarily assumed unprecedented responsibilities and burdens, and which, without boasting, it knows it materially assisted to win.

The ideal for which our young men died is symbolized in the Prince of Wales, as he also symbolizes for the bereaved parents of Canada the youth they mourn, and all this, the summation of five years of tense national living, when added to the undisguised and boyish pleasure shown by the Prince at the lively reception given him in his progress, is part of that amazing community of interest and ideal, that intangible, sometimes seemingly incongrous and contradictory spirit that binds together the commonwealth of the British peoples.

HOISTING MEN IN B.C. MINES—NEW SAFEGUARDS.

As a result of the lessons learnt from the investigation of the causes of the accident at Nanaimo by which sixteen men were killed through the breaking of a hoisting rope, the Coal Mines Regulation Act of British Columbia has been amended by the insertion of new clauses requiring that all cage chains in general use shall be annealed once in every six months, and that detaching hooks shall be cleaned and re-fitted once in every three months. It is also required that every winding-rope shall be given a bath in hot oil before being put on, and that every winding-rope shall be re-capped at intervals not exceeding six months. It is also provided that no winding rope which has been in use for more than two years, or which has been spliced, shall be used for raising and lowering persons.

These are all very necessary, and rather elementary precautions, and if they are strictly enforced the risk connected with hoisting men in mine shafts should be much lessened.

Examination of the thimble or ring through which the hoisting rope passes immediately after leaving the pulley is also necessary. There is a case on record in Nova Scotia where the detaching hook failed to hold the cage because the ring had been worn too wide by the constant friction of the hoisting rope.

Hoisting ropes, and indeed wire ropes of all kinds used in mining, are too often neglected. Haulage pulleys are not replaced when broken, and are often found so worn or misplaced as not to revolve. The haulage rope drags on the wet ground, often in acid water, and altogether wire ropes are more often misused than used. Ropes supplied by good makers are manufactured with sufficient internal lubrication to last for a reasonable time in use, but no manufacturer can overcome the results of later neglect to lubricate, or of mis-use. Above all, no rope should be used too long. Ropes that are too weakened or too old for one situation often do very well in lighter work, but most accidents in connection with ropes occur from too prolonged use.

MINING COURSES FOR WORKING MINERS.

The August Bulletin of the American Institute of Mining & Metallurgical Engineers contain an announcement with regard to the commencement of a "Co-operative Department of Mining Engineering" in the Division of Science and Engineering of the Carnegie Institute of Technology, the especial interest of which lies in the attempt that is to be made to afford an opportunity for higher technical education to men who have, as the "Bulletin" phrases it, "made good" as practical coal miners.

This is the great lack of technical education as applied to coal-mining, or indeed any kind of mining, in Canada. There exists abundant opportunity for the young men who can attend university classes as a day student for a number of years, but there is a great hiatus between these institutions of learning and the "man at the face."

In a Bulletin dealing with the coal mines of Nova Scotia, written four years ago, the Editor pointed out that in Nova Scotia the provincial government had provided a Technical College at Halifax where mining and general engineering courses could be taken, and

that there were five other colleges in Nova Scotia at which engineering courses could be taken, yet, with all this provision of educational institutions, not one of them has the financial resources to equip really adequate laboratories for research work, nor are any of these colleges sufficiently near to the mining districts to allow the use of their laboratories and scientific equipment by students who work during the day and attend schools in the evenings.

It was suggested that it might be found possible by a system of scholarships awarded on the excellence of work done in the evening mining schools, to select promising students for short mining courses in Halifax, and "thereby remove the financial limitation that prevents many young miners from taking advantage of the Halifax Technical College."

This difficulty is still a very real one. One of the most promising attempts to remedy it, is the Haileybury Mining School, which, fortunately it has been found possible to place within tram-distance of the mining activities of Cobalt.

The wealth invested in Canada's coal mines, and the number of persons employed therein, is of course very small compared with the phenomenal status of the United States coal industry, and we have not such wealthy foundations as the Carnegie Institute to help our educational authorities, but unless some feasible bridge is provided by which the son of the miner, and the son of the minor colliery official, can obtain a more adequate education in the science of mining, these men will continue to suffer under a heavy disability. This does not mean that many Canadians have not been able to forge their way to positions of responsibility and eminence in the mining profession minus the aid that a university education would have given them, but they have done so despite their lack of opportunities, and many deserving men have just failed to grasp that higher status in their profession that a little more technical education would have given them. They have seen the son of the stranger take the positions they themselves should have filled, but for this small yet fatal lack.

One of the problems of the large mining companies is to find suitable men for official positions. One often hears the complaint that our young men are not what they used to be, but a little thought will show the unfairness of such a complaint. The truth is that in some of the provinces of Canada we have not only failed to keep step in the educational march, but we have slipped back.

Technical education in coal-mining should not consist of sufficient knowledge of formulae and text-book lore to pass an examination for a certificate of competency in an official position. There is nothing of less real value as the test of a man's fitness for official positions than the average examination, which is a test not of knowledge, but of memory.

There should be some means provided by which students, already working in the mine, should be selected and given the opportunity to take such a course of technical training as will occupy from six months to two years. Until this bridge is built, the mining industry can never draw fully upon that reservoir of material composed of the working mining population itself, which if heredity and native skill goes for anything, should provide the very best kind of officials. We are daily wasting our national man-power when we leave untapped this great body of hereditary occupational skill. Indeed, such a course is worse than waste, because the brains that might under proper training have served to build up the mining industry, may, because of thwarted opportunities and lack of outlet for intellectual energies, turn around and pull it down, as they have done elsewhere.

RUIN AND RESTITUTION IN FRANCE.

We reproduce in the current issue of the "Journal" a description by Dr. Frank H. Probert, a first-hand and competent witness, of the far-reaching economic destruction carried out by the Germans while in France, and particularly just before they were driven out by force of arms.

Thanks to the courtesy of the Editor of the "Mining & Scientific Press," from which excellent periodical Dr. Probert's article is copied, the "Journal" is able to include a series of original photographs taken by Dr. Probert, which are of a nature to make comment superfluous.

"WILD CATS."

It is pleasing to learn that the Ontario Government contemplates following up its recent prosecution of doubtful oil promotions by devoting some attention to the more than dubious mining stocks that are being so freely advertised at this time.

Reports of a revival of mining activity from every part of Canada are reaching this "Journal," and in British Columbia as well as in Ontario the quickening of interest in mines is being accompanied by the unwarranted booming of unproven mining ventures. Some remarkable phrases are being used to dazzle and attract the moths to the candle. One advertisement referred to cross-cutting "in the sheared zone of third enrichment" which sounds like something, but really means nothing.

Other advertisements emphasize the proximity of prospects which are being promoted to proved mines, which also implies nothing. Again, one reads of surface veins which are expected to join at depth, and when so joined are expected to contain high values.

Some extremely reputable newspapers are opening their advertising columns to this kind of bunkum information that is intended to deceive, properly characterized by the Attorney-General of Ontario as being vague, illusive, and mainly "glittering generalities of the 'get-rich-quick' variety."

The Geology of Ontario as it Affects Gas and Oil Production

By DR. M. Y. WILLIAMS, D.G.S., Ottawa, Ont.
Presented at the Organization Meeting of the Natural Gas and Petroleum Association of Canada, London, Ont., June 18th, 1919.

Both gas and oil are rock products and controlled in their occurrence by geological conditions. It is, consequently, the work of geologists to seek out and interpret the controlling conditions.

Investigations follow two main channels: first, the study of rock outcrops; and second, the study of well samples and well records. Without the study of exposed rocks we could not determine the age or many of the characters of the rock formations, and without the drillers' records, we would, for the most part, be in the dark as to the conditions of oil occurrence.

For gas or oil accumulation the necessary conditions are: the presence of oil or gas in the formation being tested; porous rock which may contain oil or gas; an impervious cover rock, or in some cases an impervious basal formation; and last but not least, suitable rock structure to cause oil or gas accumulation.

In general, oil and gas occur together, in varying relative proportions, and are accompanied by salt water. Because of the greater specific gravity of salt water, the oil and gas are caused to accumulate in anticlines and domes, at abrupt changes in rock dip, or in the upper parts of lenses of porous rock. Where no water is present with the oil and gas, or where the formation is only partially filled with these fluids there is a tendency for pools to form in synclines or basin structures above an impervious floor rock.

In Ontario five formations have produced gas and oil and a sixth is reported to have produced gas. Starting with the highest formation and going downward, these are, the Corniferous, the Salina, the Guelph, the Clinton, the Medina and the Trenton.

The Corniferous (also known as the lower or big lime and by geologists divided into an upper division called the Delaware limestone, and a lower division called the Onondaga limestone) formation is the producer of oil at Petrolia, Bothwell, Oil Springs, Mosa and other smaller fields. The Salina is reported to be the gas-bearing formation of the Kent field and one of the oil-bearing formations of the Tilbury Field.

The Guelph formation produced oil in the Leamington Fletcher, and Wheatley fields, and gas in Gosfield, Mersea, Wheatley, Tilbury, Oil Springs and Shetland.

The Clinton produces gas in the Onondaga, Caledonia, and Cayuga fields and at Port Colborne west of the canal.

The Medina sandstone is the main gas producing formation of the Niagara Peninsula, near Brantford, in the Port Dover and Delhi fields and elsewhere, and produces some oil in Onondaga township near Brantford.

The Trenton formation has produced small quantities of oil on Manitoulin Island, at Milton, and near Kingsville. It is now attracting merited attention because of its commercial production of both oil and gas in Dover West township.

The important problem for us all is the future production of oil and gas. We will consider this by formations.

The Corniferous formation has been, obviously most explored, 1st because it occurs at shallow depth, and 2nd because it is penetrated in the drilling of deeper holes. The oil occurrence corresponds closely to the rock structure and new fields are best explored after careful structural work has been done such as that carried through to such splendid success by F. J. Carman and John McLeod in Mosa Township. Portions of Eastern Lambton county, Western Middlesex county and a few selected areas in Elgin and Kent and possibly Essex counties are still insufficiently explored.

I can say little of the future of the Salina formation as at present it is not clearly differentiated from the Guelph.

The Guelph formation lying west of a line drawn from Southampton past Kitchener to Paris, and north of a line from Paris to Windsor can scarcely be said to be explored outside of a few localities, such as Oil Springs. The structure in the Guelph is not easy to determine as where salt lenses occur in the overlying Salina formation the Guelph is not parallel the higher formations. There are no horizons in the Guelph which can be readily recognized from place to place, and hence the structure is not readily worked out, even where numerous records are available.

The Clinton and Medina formations have been carefully explored, and the gas companies are well prepared to explore any untested areas.

The Trenton is perhaps the most alluring and at the same time the most illusive of the oil and gas bearing formations of Ontario.

On Manitoulin island where it has been drilled at several places, the formation varies in depth from surface outcrops to about six or seven hundred feet from the surface. Oil has been struck in a number of wells, but the supply did not last. However, the wells were drilled too near the outcrops to test the field properly and no attempt was made to work out rock structure.

The recent careful and systematic work carried on by the Union Natural Gas Company in Dover West Township has been crowned with success, and a commercial production of oil and gas is being obtained from the Trenton at a depth of 3,000 to 3,500 ft. We learn from this drilling, however, that pockety, porous rock seems to control the accumulation of oil and gas, which here occurs in a syncline. Only a small quantity of salt water is present. If any general theory can be deduced from a study of the Dover field it is that low, rather than high structure is favorable for oil in the Trenton formation.

Besides the south half of Manitoulin island, large areas of land underlain by untested Trenton lie between Lakes Huron, Erie and Ontario, and a line drawn from Collingwood to Port Hope.

One other area of possible value for oil and gas is to be found to the west and south of Hudson Bay. Here the Corniferous and the Trenton formations have been found, and it is probable that the Guelph also occurs there. It is my plan to start for Moose Factory on James Bay the 1st of August to study conditions affecting oil or gas occurrence.

Ruin and Restitution In France

By Frank H. Probert.

It is almost five years to a day since the fostered dreams of world domination by Germany assumed tangible expression by challenging the balance of power. The dream is dissipated, right has conquered might, but at what cost! During the seemingly endless days of struggle the Allies looked to the United States for moral, financial, and material support, and finally for the man-power that gave strength to the knock-out blow. The peace treaty was signed after much discussion, deliberation, and delay, in the same room at Versailles as witnessed the preliminary parleys for the exacting treaty imposed by Germany on the French, concerning the price to be paid for the Franco-Prussian war, but has the world caught the reflection from the Hall of Mirrors of the ruins of northern France, or the image of crimes unthinkable? This is not the time to arouse or excite hatred of the Hun, but 'lest we forget' that the wounds of France still gape and that crippled industry will have to struggle for many years, a few close-up views are worth contemplating.

In 1918 M. de Billy,* as head of the French High Commission visiting Washington, invited Secretary Lane of the Interior Department to send a commission to France to study the condition of the coal and iron mines and discuss with French engineers plans for the future. At that time many properties had been destroyed by shell-fire—a destruction inevitable in waging such a war—but since June 1918 ruin of another kind has been wrought and wrongs done that cannot be excused, explained, or exculpated. In January of this year I visited the Western Front as a member of the American Mining Mission, my associates being Dr. F. G. Cottrell, and Mr. George S. Rice, of the U. S. Bureau of Mines. Every facility and courtesy was extended to us by both the French and United States governments to carry out the investigation, and in three months we motored nearly 2000 miles through the Pas de Calais and Nord districts of the Valenciennes coal-fields, the iron-ore districts of Luxemburg, Lorraine, and Lorraine Annexée, and the coal areas of the Saar Valley. My remarks are not based on hear-say information; my convictions come from close personal contact with the conditions as they exist to-day, and the accompanying views were portrayed by my camera. Documentary evidence is available to show that it was the intention of Germany to destroy the mines of France and so render her commercially impotent; field evidence shows that their plans were executed systematically, scientifically, and almost successfully.

In order to understand the German strategy of the Western Front it is necessary to look back fifty years At that time Germany had great coal mines in Westphalia and the Saar province, and but limited iron ore resources. The possibilities of Eastern Lorraine were being proved and by the Treaty of Frankfurt, signed on May 10, 1871, France ceded to her conquerors all the outcrop mines of the vast iron-field. The boundary was drawn with meticulous care, guided by engineers and geologists, to include all the land known to be commercially mineralized, but when Thomas and Gilchrist, two English metallurgists, developed the basic Bessmer process to treat high phophorus ores, the French explored the lands to the west of Lorraine Annexée, with the result that in 1913 the known reserves of the great Briey basin were owned by the Germans and French in the ratio of 2,330,000,000 to nearly 3,000,000,000 tons respectively.

Immediately following the close of the Franco-Prussian war the Germans developed their steel industry with great rapidity, and just before the outbreak of the recent war they produced 21 million tons of iron ore from Lorraine Annexée and purchased 9 million tons from French Lorraine, from which they made 19 million tons of pig-iron annually. Of the iron ore smelted in German furnaces 58% came from Lorraine Annexée, and with the return of this land to France, the domestic supply will be less than 20% of the capacity of the plants. France received German coke in return for iron ore. In normal times France is compelled to import coal to meet her domestic and industrial needs. In 1913, 43 million tons of coal was mined from the Valenciennes field and 20 million tons imported. Here then was the situation; an iron ore supply coveted by Germany coextensive with Lorraine Annexée, and practically all the coal mines lying immediately south of the Belgian border. The German hordes swept down into France and for over four years the titanic struggle was fought out on the fringe of the mineralized area. Two-thirds of the iron reserves were in the hands of the enemy during the War. It was in order to strengthen the hold on this important asset that the St. Mihiel salient was formed and Verdun attacked in 1916, while the bitterest of battles were ceaselessly waged for possession of Lens, the centre of the coal-field. Both iron and coal mines were worked by the Germans during their occupancy, worked as intensively as their diminishing virile man-power would permit; captive labor was forced to assist, and compelled under threat of death to participate in the wilful destruction, as soon as the inevitable result of the war was realized. The steel works of Lorraine, metallurgical plants planned and equipped with every modern device for efficient operation, were quickly modified to turn out weapons of war during the first year of the conflict, after which, as I shall show, they were dismantled piecemeal; the desirable equipment being transported across the Rhine, the rest destroyed with a deviltry difficult to comprehend. At the south end of the district the steel plants at Pont-a-Mousson were damaged by shell-fire: this town was never occupied by the Germans, but from Briey northward to the Luxemburg line, the wonderful works have been sacked and wrecked beyond recognition. Coal and iron are complementary minerals, the two **grands seigneurs** of the mineral world. From them are fabricated the weapons of war as also the plowshare of peace; with them a nation is strong financially, commercially, and industrially, always, of course, assuming the legitimacy of motive prompting production. Bismarck characterized the former war as one of "blood and iron," the iron of Lorraine was the price of peace, and the industrial association of Berlin and Dusseldorf in 1917 declared to Hertling and Hindenburg that "the annexation of

* We regret deeply to record the fact that Colonel Edouard de Billy was thrown from his horse and killed on June 12 in France.—Editor, M. &. S. Press.

Lens, in April, 1919.

Shaft No. 4 at Courriere, in the Pas de Calais.

Shaft No. 11, at Bethune.

Surface Plant at the No. 4 Shaft, at Courriere.

Steel Plant at Longwy.

Rolling-Mill of the Longwy Steel-Plant.

Steel Works at Mont St. Martin.

Shaft and Plant at Bethune.

the Briey and Longwy basin is indispensable because the possession of this region is of incalculable value to Germany for economic, industrial, and agricultural reasons, in view of a future war."

In 1913 the 29 iron mines of the invaded section of the Briey and Longwy basins gave employment to 15,200 men and produced 17½ million tons of ore. During the four years following August 1914 the Germans worked the mines intermittently, the shipped all of the ore on the stock-piles to the steel works, and mined at the rate of 30% normal output. The underground workings were not seriously damaged at any of the properties, although many of the surface plants, particularly the miners' dwellings, were razed. The damage is more indirect and the visiting engineer notes that the ore was removed from the most convenient workings; pillars have been robbed near the main galleries, thus threatening the arteries of underground transportation; the extraction of ore without proportionate advance of development headings will postpone the pre-war scale of output for some time; the machinery has been abused for want of lubricants and every ounce of copper, the trolley-wires, motors, brass fittings, as well as all rubber, have been removed. The truth of the story that thunderous applause followed the statement of the Chancellor in the Reichstag denying the shortage of copper was drowned by the noise of the tinsmiths removing the copper-sheeting from the roof of the buildings, is emphasized wherever one goes in the invaded territory.

Unquestionable large sections of the developed areas underground will be permanently abandoned because of the improper mining done by the robbers. At St. Pierremont I was impressed by the extraordinary regard for the welfare of the workmen; hundreds of cases of mineral water were stored at the shaft-station on one of the levels for the Germans to drink, fearing the valiant had copied the vicious and contaminated the water supply!

Iron ore is of no value unless it can be beneficiated. What has happened to the steel plants? Visit Micheville, go to Longwy, ponders the ruins at Mont St. Martin; never a shell was fired here, but the destruction is complete. At the first mentioned plant, M. Nahan, the veteran manager, bowed with the weight of years and tormented by the nighmare of recent events, tells of the conscription of 2000 of his Italian workmen to destroy the model plant. German officers dwelt in his house while he was kept prisoner, presentation bronzes were confiscated for the few pounds of copper they contained, and the plant itself, what of it? All machines that could be moved were shipped to Fatherland, the rest destroyed; it is a mass of fallen stone and twisted steel, a scrap-heap impossible to describe. At the Aciéries de Longwy, the largest steel works in France and employing 7000 men before the War, the ground must be cleared clean that a new mill may memorialize the irrepressible spirit of France. Here one sees train-loads of high-grade steel cut up into movable pieces that were to have been sent to Holland to be turned into shell; the crank-shafts, rollers from the mills, and cylinder-heads were cut with the oxy-acytelene torch or broken by liquid-air cartridges (high nitro-glycerine explosives were getting short toward the end), the boilers were blasted, and the structural steel of the buildings cut at the base, to be overturned. M. Dreux, the managing director of the company, showed me two antique brass candle-sticks on the mantel of his living-room labeled by the marauders and spared to posterity because they were considered 'works of art." Surely such magnanimity entitled Germany to mercy at the peace-table!

The Pas de Calais and Nord coal mines have suffered even more than the iron and steel plants. The damaged area embraces 24 of the 27 concessions; the Gruay mines were not forced to shut-down although damaged by long-range shell-fire and aerial bombs; eight concessions suffered from artillery bombardment and were later pillaged, while toward the eastern end of the district sabotage finds its most glaring expression. Twelve concessions had the surface plants of the many mines completely destroyed wilfully and systematically during the final retreat of the defeated Germans, even as late as October 28, 1918. The coal measures are overlain by water-bearing strata and quick-sands, so that the shafts were sunk by special boring methods and lined with steel cuvellage; this was blasted with dynamite and the mines flooded. Of the 286 shafts 70 were dynamited, 172 are now filled with water, and 235 of the surface plants, magnificent steel structures built with the idea of permamency of operation, are partly, more often totally, destroyed. The few that escaped show the nature of the crime committed, for every building, every head-frame, bears a label giving the estimated quantity of high explosive necessary to wreck it. Many of the steel supports were cut by the oxygen flame and tumbled over into the already flooded shaft. The accompany photographs tells the story better than words. Lens, the centre of the coal-field, is completely destroyed and presents one of the dreariest spectacles imaginable. Near Lens the little river of Souchez was turned into the mines and for part of its course has disappeared, now flowing through the underground workings. Between Gruay and Valenciennes there is widespread, deliberate, and malicious destruction. Bethune, Lens, Courriere, La Bassee, Douai, and other coal-mining centres, are crushed and crumbling ruins.

The problems of reconstruction, reparation, and rehabilitation are many. They are faced with a fortitude, courage, and determination equal to the gigantic task, and they will be solved. France has lost during the War 75 per cent of her peace-time industries, the debts now aggregate three-fifths the total wealth of the country, her young man-power is sadly depleted and greatly exhausted, during the War the deaths exceeded the births by 800,000, but, while materially impoverished, France is morally strengthened, and moral energy is as important as material resource. Full restitution for the wrongs done is impossible except in so far as the allied powers combine to permanently wreck the national industry of Prussia — which was to wage war.

The peace treaty of June 28, 1919, gives to France Alsace-Lorraine, 5,600 square miles, the frontiers to be as before 1871. In part compensation for the destruction of the coal mines, and as reparation, Germany cedes full ownership of the coal mines of the Saar Valley with their subsidiaries, accessories, and facilities. This is but a sop, for if France will beneficiate the additional iron ores of Lorraine she must purchase proportionately larger quantities of coal. The coal situation was menacing before the War; it is now aggravated. In 1913 it was necessary to import 20 million tons, and this when the Valenciennes field was giving its normal output. The whole product of the Saar mines

in actual tonnage, saying nothing of the inferior quality of the coal, is not sufficient to offset the lack of coal from Northern France.

The Saar produces four grades of coal none having the calorific value of the coals of northern France or of Westphalia. They can be used most advantageously for steam and domestic purposes but they are not good coking coals, one ton yielding little more than half a ton of coke, which is friable and of very inferior quality metallurgically. The Saar coal is sometimes referred to erroneously as the economic complement of Lorraine iron. Under German control the iron ores of Lorraine, the coal of the Saar and Westphalia, and the steel plants of all three districts, were treated more or less as a unit industry and most effective exchanges were made by means of the available cheap transportation. It is of vital importance to France that this exchange be maintained under intelligent government control; if coal from Westphalia is withheld the steel industry cannot expand, and either many of the iron mines will remain idle or a great surplus must be exported.

It would be presumption on the part of an American mining engineer to suggest improvements in methods or practice in French mining. The French engineers have long known their own problems and have solved them in accordance with their system of finance. Their mines are developed and equipped with the idea of permanent industry, and unless there is serious labor unrest and extraordinary advances in wage scale, the old French practice is peculiarly suited to French conditions. Their policy is progressive and there is constant search for new mineral areas or extensions of proved deposits. French Lorraine has greater reserves of iron ore than Lorraine Annexee and just before the outbreak of the War drill-holes had shown the extension of the coal measures of the Pas de Calais southward. Iron and coal are complementary minerals. France will have them both in larger quantity than in 1914, and when her reconstruction program is carried out, the steel industry will be among the first assets of a land that has suffered greatly.—Mining and Scientific Press.

PROSECUTION FOR BREACH OF ONTARIO MINE LAW GOVERNING MAN CAGES.

The White Reserve Mining Company, Limited, were fined $100 and costs by Police Magistrate S. Atkinson at Haileybury, on August 4th, 1919, for permitting men to be hoisted on a cage whose sides were not enclosed and which was not equipped with doors as required by the Mining Act of Ontario.

NIPISSING DECLARES DIVIDEND.

At a meeting of directors held in Toronto on Aug. 29 the usual quarterly dividend of 5 per cent was declared. The financial statement showed a substantial cash surplus on hand, in spite of the fact that production was discontinued five weeks ago by the striking of the miners. Surplus assets on Aug. 23, in cash, war bonds, ore and bullion totalled $3,863,386.

Japanese coal output in 1918 was 27,500,000 tons, compared with 21,083,000 tons in 1913, and consumption in 1918 was 25,980,000 tons, an increase of 7,925,000 tons over 1913.

Special Correspondence

NORTHERN ONTARIO.

The Gold Mines.

Reports from the Porcupine field continue favorable. The gold production having reached a point that exceeds any previous record in Ontario's history, and increasing in volume, the outlook for this most northerly of the mining camps of the province is bright. Labor strikes in Cobalt and in Kirkland Lake have released not far under three thousand men a large number of whom are finding their way to Porcupine. Interesting reports continue to come from Northern Manitoba in connection with the new gold find. A fair sized rush of prospectors is taking place and, within the next week or two, more or less detailed information should be available. A number of prospectors from this district are on the scene of the discovery.

With the Hollinger Consolidated Gold Mines now producing gold at the rate of around $7,000,000 annually; the Dome producing at the rate of around $2,000,000 annually, and the McIntyre producing at a rate about on a par with the Dome, it is evident that the combined output of these three gold mines is at a greater rate than ever before established by all the gold producing mines in the province of Ontario.

Official figures confirm the above estimates in so far as they apply to the Hollinger and the McIntyre. In regard to the Dome, while the figures given may be actually about the present rate of output, yet shareholders would perhaps do well not to look upon this as being maintained without variation. It will be remembered that according to official advice presented not long ago in these columns that the directors of the Dome are willing to issue monthly statements just as soon as uniform production is achieved, but that to issue such statements under the present circumstances might lead to erroneous analysis being made.

One fact is made quite clear, however, and that is that gold mining is once more on a fair way to become a profitable business. With the three leading mines rising above the adverse influences, it is considered probable that the medium-sized gold mines will soon follow suit, and that during the coming year all will again be well.

The limited amount of information coming through in connection with the new gold discovery in Northern Manitoba is such as would arouse the interest of prospectors in general. It is stated that the pay-streak in the vein discovered, is about four inches in width and is very rich. What has not yet been definitely learned here is as to whether or not the vein outside of the pay-streak contains commercial gold values.

As is well known in gold mining, narrow pay-streaks are usually found to be erratic and cannot be depended upon as a source of steady output. On the other hand, provided the main body of the vein carries commercial values, the pay-streak even though narrow would serve to greatly increase the average value of the whole. The general impression appears to be that an important find has been made, and the early future will be looked to to justify or refute this impression. In the meantime a fair sized rush of prospectors is taking place.

Cobalt.—General Situation.

The lator situation at Cobalt remains unchanged, except for the fact that more men are leaving the camp for the purpose of finding employment elsewhere. The mining companies show no inclination to change their attitude in so far as the Cobalt Miners' Union is concerned. Through the Returned Soldiers they have offered all workers of Cobalt re-instatement to their former positions and as stated last week have agreed to a system of collective bargaining that would give representation to every worker in the camp through one Central Council, and beyond that they refuse to budge. In a word the only obstacle to a resumption of work and an open discussion of all questions pertaining to labor is the recognition of the Cobalt Miners' Union which the companies declare is but the Western Federation of Miners under a changed name, the latter of which they will not recognize. In the meantime the quotations for silver continue to rise, being quoted recently at $1.15¼ an ounce in New York.

During the month of July, from July 1st to noon of July 23rd, the Kerr Lake mine produced 196,637 ounces of silver valued at over $200,000. This compares with an output of 105,402 ounces for the whole of June.

The McKinley-Darragh has declared its regular quarterly dividend of three per cent, payable October 1st. The disbursement will amount to $67,428, and will be the fourth dividend paid this year.

The McKinley-Darragh went on a dividend paying basis in 1907 during which year a two per cent disbursement was made. Up to the end of 1918 a total of 241 per cent or $5,349,595 had been paid. Added to this is the 1919 disbursements, amounting to 12 per cent or $268,712, including that declared for October first, thus making a grand total of 253 per cent or $5,618,307.

The McKinley-Darragh Company is in the happy position of having earned almost a full year's dividend requirements during the first seven months of the year, and a strike, even though it should last for several months might not seriously impair the financial position of the company.

As a result of no general effort to induce the Ontario government to make arrangements for throwing the Gillies Limit open for prospecting this year, it is feared nothing will be done.

The New Liskeard Branch of the G. W. V. A. took up the question at a meeting not long ago, at which it was decided to submit the following letter to the Hon. G. Howard Ferguson, Minister of Lands, Forests and Mines:—

"This branch of the G. W. V. A. considers the time has now arrived for the opening of the Gillies Limit for prospecting, and that the said Limit should be opened up this fall, Returned Soldiers to have one month's preference to stake claims thereon before others are allowed to stake on said Limits."

(Signed), J. M. Baird,
Sec.-Treas.

Concerning this, not a few returned men have been looking quietly into the possibilities of the Limit, and have volunteered the opinion to the writer that they are confident the Limit would develop in a promising way if opened this fall, thus permitting prospectors to do a limited amount of surface stripping before winter sets in, to be followed by sinking test pits during the winter.

Similar views have been expressed by others, but as yet no statement has been forthcoming that would indicate that the government has lent a sympathetic ear to the proposal. However, it is perhaps not yet too late to press the request, which, if granted, might reasonably result in considerable activity in the more promising parts of the Limit.

Kirkland Lake.—Workmen the Only Sufferers From Strike.

In a number of instances, some of the leading mining companies in the Kirkland Lake gold area are laying plans for remaining idle for considerable time, in some instances until next spring.

The labor strike caught the camp just at a time when, with one exception, the mines were not paying any revenue to their shareholders. The Tough-Oakes had only been reopened after staggering for several years through litigation which had a direct bearing on retarding its development; the Burnside was being explored in a comprehensive way for the first time in its history and is to be merged with annex the Tough-Oakes, thus leaving it in a position similar to the latter; the Wright-Hargreaves had just completed arrangements to instal a big new mill to be completed before winter set in; the Kirkland Lake Gold Mines had just started to produce gold in a small way; the Teck-Hughes had succeeded in treating a tonnage sufficient to indicate that it was at last nearing a point where a fair margin of profit might be realized; while, the one paying mine, the Lake Shore, was working at full capacity and returning dividends at a moderate rate to its shareholders.

To those who are familiar with the situation, it is evident that a number of the mines were soon to begin returning revenue to their shareholders, in spite of the high wages being paid the employees and the abnormal cost of material and supplies. However, now that operations have been curtailed by a labor strike, the concensus of opinion appears to be that the mines as a whole will ultimately yield a larger amount of profit to their shareholders than had they been worked unremittingly during the present period of abnormal costs. With these facts in mind, it will perhaps not come as a very great surprise to learn that such mines as the Tough-Oakes should make arrangements to remain idle until next spring.

This fall should see the macadam road completed as far as the Wright-Hargreaves mine, and with the arrival of next spring the balance of the road as far east as the Tough-Oakes can be soon completed.

Therefore, the indications are that by early next summer the mines will all be in a position to operate at full blast, and probably not handicapped by economic conditions such as exist this year. Therefore, the labor strike appears destined to be responsible for the loss of one year, although perhaps ultimately advantageous to company shareholders. To the workers in the mines and mills it will probably represent a reduction in payroll of approximately one million dollars.

Boston Creek—Government Surveying for Road.

The government is making a survey from Boston Creek station on the T. & N. O. Ry. as far east as the centre of activity in the Skead township gold area according to information just to hand. Prospectors

have travelled most of the intervening territory and believe that they have located a suitable route, and government surveyors are stated to be making a preliminary survey.

According to available information, no serious obstacles are to be encountered and with the exception of building a bridge over the Blanche river, the road, it is believed, may be built at very reasonable cost.

With development work in Boston Creek proving highly satisfactory, and with an excellent prospective area extending all the way east to the east side of the township of Skead, a road some fifteen or sixteen miles in length would pass through a strip of territory which gives promise of containing commercial deposits of gold in various places for the entire distance.

Miller-Independence Mine.

The necessary contracts have been entered into between the Miller Independence and the Northern Ontario Light and Power Company in connection with the electric energy required to operate the new modern mining and milling plant which is being installed this fall at the Independence. A survey has been made, and the route chosen runs due esat from Boston Creek, following a line a half a mile south of the north boundary of the township of Pacaud.

On Monday of this week a contract was let for the cutting of a right of way for the transmission line from the main line at Boston Creek to the mine. This work will be started immediately, and should be completed by the end of September. Cement for new foundations, as well as a large part of the building material is already on the ground.

A meeting of the directors of the company has been called for August 29th.

Examination of Lake Agotawekami Properties.

A recent revival of interest has taken place in the Agotawekami Lake district, situated in the north-western part of the Province of Quebec, a short distance south-east from Lake Abitibi and about twenty-five miles north-east from the Lightning River district.

According to reports just received from that district, Mr. Perry, representing the Timmins interests of the Hollinger Consolidated, has concluded an examination of some of the surface outcrops in that district and has been sufficiently encouraged to secure a large number of mining claims. It is understood the majority of these claims had been staked a couple of years ago following the small prospectors rush at that time, but that for the greater part the assessment duties were not complied with and the territory had been allowed to revert to the government.

The principal showing is said to occur on an island situated close to the mainland, and consists of a large body of gold-bearing quartz. Assays taken from the deposit at the time of the former rush, showed the deposit to be too low grade to be of commercial value. As to whether or not Mr. Perry's examination has met with better results, or that the low values are considered sufficiently encouraging to warrant a reasonable amount of exploration work, has not been made clear.

Industrial Growth in the North Country.

In that territory lying along the Ontario-Quebec boundary, beginning at the south end of Lake Temiskaming, and extending into the far north, destiny is shaping plans that will in time elevate this district to a position of world envy. Just as the great silver deposits of Cobalt, and the gold deposits of Porcupine, Kirkland Lake and Boston Creek have laid the foundation for a beginning, so will the other natural resources in the form of additional mineral deposits, pulp timber, agriculture, water-powers, etc., constitute the basis for the great and lasting future expansion. The Abitibi pulp and paper mill is already one of the largest of its kind in the world. It is situated in Ontario, at Lake Abitibi, and has been established at an estimated cost of perhaps a dozen million dollars. The Quinze water-power, just above the head of Lake Temiskaming, and the development of which is even now under contemplation, is estimated to be sufficient from which to develop upwards of 100,000 h.p. Farther south, or just at the foot of Lake Temiskaming, the Kipawa Fibre Company is completing the first unit of a plant that is being constructed at a cost of about $5,000,000. This first unit is expected to be in operation some time in October of this year.

One of the newer projects is that of big eastern interests who are understood to be making preliminary arrangements for harnessing the outlet of Kipawa Lake. It is estimated that this scheme is calculated to generate electric energy at a rate second only to Niagara on this continent.

In all parts of the world, it has been found that great centres of industry quickly spring up, following the advent of abundance of cheap power. It is believed that in Northern Ontario and in North-western Quebec this same condition will hold good. Accordingly, the contention appears to be well-founded that the boundary towns, particularly those situated along or close to the shores of Lake Temiskaming or the Ottawa River are destined to share great advantages accruing from rapid and extensive industrial growth along the northern reaches of the provincial boundary.

Experimental Ore-Treating Plant—Haileybury Mining School.

Further, that Ontario and Quebec are not going to grow and other provinces lag, is made evident in the detailed information coming from Manitoba, where work has already been started at Little Du Bonnet Falls with the object in view of developing some 160,000 h.p. at a cost of about $9,000,000.

Soldiers' Courses at Haileybury Mining School.

A new Vocational Branch of the Soldiers' Civil Re-Establishment opened at Haileybury, is already a very busy place, over 50 applications for re-training being already applied for.

Any soldier disabled by the war and unable to continue his former work is entitled to retrain in some suitable occupation, and is allowed pay and allowances

amounting to from $60 to $110 per month for a period of six months training. Men who enlisted with the C. E. F., under the ages of 18 years, whether disabled or not, are allowed training in an industry, or a course at school or college, and are allowed a total of $60 per month, in addition to any school or college fees, which are paid by the government.

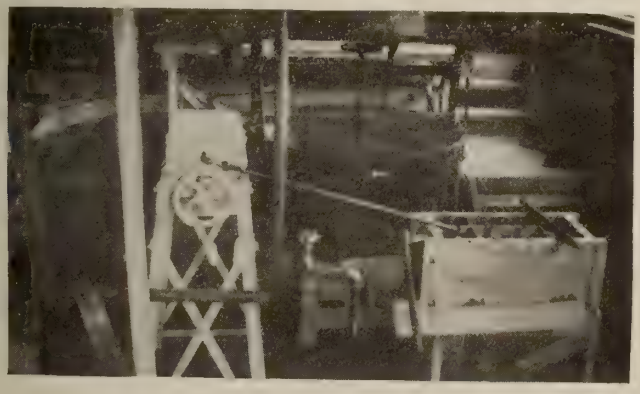
Already a good many men are applying for courses in assaying and metallurgy at the Haileybury Mining School, and some applications for course in business and railroad telegraphy have been approved of.

Major A. H. Smith, who was a resident of Northern Ontario before the war, is in charge of this new office and has lately been joined by Major S. M. Thorne, who will be in charge of placing men with the industries.

Workshop—Haileybury Mining School.

Kirkland Porphyry Makes an Assignment.

The Kirkland Porphyry Mining Company went into voluntary liquidation recently, when M. P. Vandervoort, solicitor for the company, made an assignment in its behalf to F. C. Clarkson. It was stated that the company has no creditors, and that there are very few shareholders. It is expected that a statement of its financial position will be issued next week. This company was prominent a couple of years ago, through a controversy, in which several mining men were engaged, having conflicting interests.



Experimental Ore-Treating Plant—Haileybury Mining School.

New Power Company for Northern Ontario.

A new company, capitalized at $1,000,000, including 5,000 shares of 7 per cent cumulative preferred and 5,000 common shares, has been incorporated under the laws of the Dominion and will be known as the Wendigo Power Company, with head office in Guelph. The company's plant will be located some 20 miles south of Larder Lake. The purpose of this company is the development of hydro-electric power on Wendigo Lake and certain parts of the Blanche River.

BRITISH COLUMBIA.

The Metal Mines.

Victoria.

Some exceptionally fine samples of gold, silver, copper ore from the Premier Mines, Salmon Arm, were brought South for assay by Hon. William Sloan, Minister of Mines, on returning from a tour through the Salman Arm District, British Columbia. The returns, to say the least, are very interesting, being as follows:—

Gold . . . . . $$512.06 per ton
Silver . . . . . 393.2 ounces per ton
Copper . . . . . 3.6 per cent

Figuring silver at $1.10, and copper at 24 cents, the value of this ore per ton would be $952.41.

Some tests of the Fleet Electrical Smelting furnace in the handling of British Columbia magnetite ores are taking place. The Provincial Government has supplied a quantity of ore from Texada Island property for this purpose. One test took place several days ago, being witnessed by the Provincial Mineralogist and other officials. While it was not as successful as might have been desired others it is understood are to be arranged.

Honourable William Sloan, Minister of Mines, has just returned after a trip through the Cariboo District. The object of his tour was to discuss with the miners and prospectors the question of dredging and placer licenses, to the end that the Government might ascertain what is necessary to encourage the opening up of that region. Mr. Sloan is of the opinion that large areas which have been held for many years without development, should be made productive. He found much interest manifested in gold mining throughout the district and believes that while the output recently has not been as large as in the past it will increase in the future. With the Pacific Great Eastern Railway, which now is being constructed through the Cariboo to Fort George, and eventually will tap the Great Peace River country, furnishing transportation facilities, operators will be able to place heavy mining machinery on their property. The Minister of Mines pointed to the fact that men with large experience at dredging operations in the Yukon are going into the Cariboo and investing heavily as being encouraging to the latter district. An instance was that of James Moore, one of the largest operators of the Yukon, who is placing a dredge on Antler Creek. His associates, wealthy Americans, have secured a large tract with promising placer grounds on the Swift and Little Swift Rivers, and preliminary investigations have so satisfied them that they have arranged to install a large dipper dredge. Mr. Sloan also spoke of the activity of the Dominion Government in conducting a geological and topographical survey covering sixteen square miles of that section. This work is centred at Harpers Camp where there is some very promising ground. At present the International Dredging Company has a machine operating with good results. At the junction of the North and South forks of Horsey River a drag line scraper is being put in by Victoria mining interests and the experiment is being watched with interest.

Barkerville, B. C.

The announcement that the Ward-Hopp litigation for possession of the Bullion placer mining property has been finally decided by the Privy Council in favor

of Mr. Ward, has been received with considerable interest in this District. The case has been before the courts for the past five years, during which time the property has been idle. And now that the Court of last resort has given judgment it is expected that the plant will be producing again in a short time. It is reputed to be the largest hydraulicing proposition in the world.

Grand Forks, B. C.

The strike of the workmen employed in constructing a line of railway from Allenby to the Copper Mountain mine in the Canada Copper Corporation having been settled, good progress is being done. Nearly 150 men are working at Copper Mountain building ore bins and getting the mine in shape for producing as soon as the railway and mill are ready for operation.

Messrs. William Thomlison and S. A. Ritchie, the latter being an engineer in the employ of the Consolidated Mining and Smelting Company, recently inspected the Franklin Mining Camp. Mr. Thomlison expressed the opinion that there were a number of first class prospects there and that milling and concentrating plants should be provided by the operators for the treatment of their ore.

Nelson, B. C.

The McAllister mine on the north fork of Carpenter Creek, has been re-opened and Mr. R. A. Grimes, President and Manager of the Slocan Silver Mines, Limited, reports that a shoot of clean silver sulphide ore has been uncovered on the third level. It is over twelve inches wide at the floor and open fan-wise as it rises.

R. S. Lennie, of Vancouver, representing the Nugget Gold Mines Limited; N. T. Burdick Bros. and Brett, Limited, of Victoria and Vancouver; and R. H. Stewart, consulting engineer, have returned from a trip to Sheep Creek where they made an examination of development work in progress on the Nugget. Mr. Lennie has made the following statement:—

"Our visit was for the purpose of inspecting the development which was commenced last March on the combined Nugget and Motherlode properties which were associated by the amalgamation of last year. This consists of a tunnel starting in No. 5 Tunnel of the Motherlode at a point 900 or 1000 feet in. This new tunnel is now through the Motherlode ground and has entered the Nugget ground and has been driven in about 650 feet. It is going in at the rate of eight feet a day, which is about what was estimated at the commencement.

"We are much pleased with the showing made, the work being carried out as originally outlined by Mr. Stewart. We find the underground condition at the horizon on which we are driving similar to that on the upper levels and this confirms us in the belief that we will strike the veins at that depth in the same condition as on the levels above.

"In some instances we were delayed by tough quartzite but we appear to be through that now, and we see no reason why we should not strike the first of the three veins we are driving for about September 15th.

The party also inspected the long bore which A. W. McCune is driving on the opposite side of the creek through the base of the Yellowstone Mountain, to strike the Queen Mine vein in a new depth. This now is in over 1200 feet and the vein is expected to be uncovered in another 300 feet.

Slocan, B. C.

Foreclosure proceedings are to be taken immediately against the Lucky Jim Zinc Mines, Ltd., owners of the Lucky Jim Mine on Bear Lake, in the Slocan District, B. C. It is expected that re-organization will take place immediately to the end that the property may be again put on a producing basis. Senator Landrum McMeans, of Winnipeg, Man., trustees for the mortgagees is responsible for the foregoing statement. Under A. G. Larsen, who acted as trustee, the Lucky Jim produced $200,000, paying off a first mortgage, lifting a floating debt, and making a start on the second mortgage of $35,000. The present action is based on the latter indebtedness. Senator McMeans proposes on acquiring control to place his interest in the mortgage into a new Company in the formation of which the co-operation of former shareholders will be sought.

The Evening Star and Silver Nugget Mines, which have been dormant for years, are to be operated again. William Moore, owner of the California Mine, is supervising the work. Cars, rails and other mining supplies have been forwarded through Nelson, B. C. The Evening Star is situated on Dayton Creek about seven miles from Slocan City. Considerable development has been done on the property and plans have been decided upon for continuing it. The Silver Nugget is situated about six miles from Silverton. This also already has been opened up to the extent of driving two tunnels. A shipment of ore from the Evening Star two years ago ran 347 ounces of silver and $23 in gold a ton while in 1894 a shipment from the Silver Nugget gave a return of $208 a ton, silver then being 57 cents.

Lardeau, B. C.

The same evidence of revival in mining is found in the Lardeau District as elsewhere in the Kootenay and Boundary sections of this Province. The New Era Mining Co., of Vancouver, B. C. proposes placing the old Beatrice Mine, situated near Camborne, on the shipping list. This property was shut down some years ago because of the low price of silver. It is situated on the summit of Lexington Mountain, near the headwaters of Mohawk Creek. The Gold Bug-Rambler Mine is reported to be showing up well under development. A strike just announced is described as consisting of 25 feet of concentrating ore with 18 inches of clean ore on the wall running high in silver with 55 to 60 per cent. of lead and some grey copper. The property is on the south fork of Lardeau Creek, seven miles from Trout Lake City. Some fine samples of clean galena have been taken from the Tenderfoot Group on Tenderfoot Creek. There are three parallel veins on this property which have been developed by about 200 feet of tunnels, the greatest depth being about 50 feet.

Rossland, B. C.

Residents of Rossland are confident that the large concentrator which the Canadian Consolidated Mining and Smelting Company will provide for the treatment of the ores of Rossland Camp will be placed in that City rather than at Trail. Surveys now are in progress and investigation is underway as to the water supply. It is thought that no difficulty will be experienced in meeting the requirement in respect of the latter. In the meantime Rossland, once the busiest mining centre of the Province but recently suffering through the comparative inactivity of the mines in which the community chiefly depends, has taken on a new lease of life and is looking confidently to the future.

Kimberly, B. C.

A forest fire swept away most of the equipment of the North Star Mine, a well-known silver-lead prop-

erty which has been producing for some time. The tram line, some buildings, and necessary plant were destroyed. This is being re-placed as rapidly as the material can be secured and the mine will be shipping again in a few weeks.

Vancouver, B. C.

Monthly returns of the gold bullion received at the Dominion Government Assay Office Vancouver indicate that the output of British Columbia and the Yukon this year is not likely to greatly exceed that of the last twelvemonth, although an encouraging upward tendency in production is noted. A substantial increase is predicted in 1920 when new properties such as those being developed on Sheep Creek begin shipping, when placer ground which has been dormant during the war is made productive, and when the dredging companies, several of which are commencing operations in the Cariboo, are operating. The value of gold bullion received at the Vancouver office from British Columbia last year was $2.178,078 and from the Yukon territory $1,921,197. This, of course, does not represent all the gold produced by these sections of Canada.

A feature of the Vancouver Exhibition, which takes place next month, will be a mineral exhibit of British Columbia ores, which is being assembled by the British Columbia Chamber of Mines. The growing importance of the mining industry in the Canadian West is well illustrated by the increased attention it is receiving on such occasions. The Britannia and Granby Companies will display copper ores; the Surf Inlet Mine will show gold ores; the Drum Lummon Mine and other properties, gold and copper; the Heeley Mines, gold ores; the Bowena Mines, copper and the Consolidated Mining and Smelting Company of Canada will enter a large educational exhibit of minerals.

An organization known as the Vancouver Mining Development Syndicate has been launched with a capitalization of half a million dollars and $100,000 capital subscribed. The object of this Syndicate is to bring mining prospects of British Columbia to the attention of the investing public. The idea is that in the event of a prospector locating a promising property which he lacks the means of opening up he can go to the Syndicate for assistance. The latter then will send competent engineer to report and, if the report is favorable, the propector will be given financial aid. Should the proposition look as well on development as it originally promised it will be placed on the market, a proportion of what is realized to go to the discovered and a share to the Syndicate. Messrs Nicol Thompson, A. M. Whiteside, J. H. Greer, A. H. Wallbridge, and A. Erskine Smith are members of the board of the new organization. They are businessmen of the City of Vancouver.

Trail, B. C.

S. G. Blaylock, who has been Assistant General Manager of the Canadian Consolidated Mining and Smelting Company for the past three years, has been made General Manager of the Company, vice J. J. Warren, who has become its president with favor in mining circles. He entered the Company's employ over twenty years ago, taking a minor position in the laboratory.

Ore receipt in gross tons for the week from August 7th to August 14 inclusive at the Trail Smelter of the Canadian Consolidated Mining and Smelting Company aggregated 7,364 tons. The chief shippers were the Company's mines, the Centre Star of Rossland contributing 1,857 tons and the Sullivan, of Kimberley, 578 tons of lead ore and 2,633 tons of zinc. The Mandy Mine, of the Pas, Manitoba, shipped 498 tons and the Quilp, of Republic Wn., 483 tons.

Salmon River, Portland Canal.

The Big Missouri Group of Claims, Salmon Arm, owned by Sir Donald Mann, is to be developed by means of the diamond drill, the plant necessary already having arrived at the property. The drilling contract has been awarded to Boyle Bros of Anyox, B. C.

Bayonne, B. C.

In the Bayonne District there is much development work underway and a number of promising properties have been from recently. On the Spokane Group the owners are building an Arrastra which their ore will be concentrated by this primitive stone mill. It is to be run by water power and will be completed in the course of a month. Two carloads of ore have been packed out from this prospect in the past two years. It is gold and silver-lead. Good showings also are reported to have been uncovered on the Echo Group and on Diamond Dick Hill.

George T. Jackson, General Manager of the Alaska Gastineau Mining Co.; James Freeburn, General Manager of the Chicago Mining Co., and George Oswell, General Manager of the Ebner Mining Co., have returned after a northern trip in the course of which they inspected properties in which they are interested.

THE COLLIERIES.

O. B. U. Strike Ended. Renaissance of United Mine Workers.

The Fernie strike and the state of idleness which has been a condition throughout the U. M. W. of A. District 18 for almost three months is at an end. For several weeks the coal miners of the Crows Nest Pass, British Columbia, and of the coal mining centres of the Province of Alberta have been restless. It was freely predicted that a break would have to come very soon and come it did. The miners everywhere have declared themselves as loyal to the international labor organization and have discarded the One Big Union.

Mass meetings here at Fernie and later at Michel, which were addressed by Robert Irvine, of Seattle, organizer for the United Mine Workers of America, proved to be the turning point. Resolutions were unanimously passed in favor of the U. M. W. of A. and some days later the men went back to work, it being left to the International to work out a temporary agreement regarding wages that would be satisfactory. Of course the Local Unions now will be reorganized. These presumably will appoint delegates to represent the miners in negotiations with the Company and in the meantime no time will be lost in putting the mines on a productive basis.

The situation is much the same in Alberta. From Lethbridge comes the report that the miners of the Galt Mines voted on the 16th of August "to drop the O. B. U. and to sign up to return to work immediately as members of the U. M. W. of A." With Coalhurst and Drumheller Camps acting in the same way the dispute now may be considered to have been settled

and the fears of a coal famine in the prairie provinces next winter are set at rest.

On the latter point Senator Robertson, Minister of Labor in the Dominion Government, spoke at Calgary shortly before the settlement as follows:—

"You will get coal this winter. I believe that labor should have an equal voice in government and in industry with other interests but influences at work to overthrow industry, confiscate property and destroy government itself shall not succeed. We are backing the international unions which believe in the sanctity of contracts. The Government is satisfied, the United Mines Workers of America will fulfill what they pledge themselves to perform. We are prepared to see the labor forces built up through the international unions so as to make labor an asset and not a menace. I believe the eight-hour day is coming. Labor could be represented in parliament by some 15 members at the present time and it would be for the good of the country that they should be there. Now that the failure of the O. B. U. movement is in sight perhaps greater attention will be turned to the need for labor representation in the House of Commons."

The Mine Operators throughout District 18 are gratified that the strike which has been maintained for so long and seriously threatened one of the most important of western industries has been concluded. They also are pleased that the One Big Union idea has been blasted, feeling confident that it will be possible to make terms with the men through the U. M. W. of A. that will be both agreeable to employer and employed and will be binding, thus rendering some stability to coal mining operations. In this connection a Calgary press dispatch announces that the One Big Union " is held to be illegal under the Criminal Code of Canada, which holds it to be an offence to support any movement which has for its object the overthrow of constituted authority." This statement is attributed to Commissioner of Coal Operators Armstrong, who has been continued in office by the Dominion Government, and by the Operators.

Alberta—The Midland Coalfield of Canada.

At the Industrial Congress recently held at Calgary, Alberta an address was delivered by Dr. Dowling on the coal resources of the Province of Alberta. He said that in the country from the Grand Trunk Pacific to the Smoky River there is as much coal as in the whole of the Province of Nova Scotia. There was estimated to be 1,000,000,000 tons of anthracite which compares favorably with the Welsh product although not as hard as that of Pennsylvannia. The area of Alberta's coal lands Dr. Dowling placed at 25,000 square miles which is in a belt 50 miles wide that runs along the foot-hills, sweeps out to the plains and back to the hills.

James White, deputy head of the Conservation Commission attacked the theory that hydro-electric power is cheaper than steam produced power. Improved types of turbines, combined with new methods of fully utilizing the steam producing qualities of coal rendered the future of hydro-electric power very insecure, especially as applied to the Province of Alberta. Mr. White asserted that, in his opinion, hydro-electric power is not the power of the future for Alberta, notwithstanding its apparent potentialities.

Coal-lands Litigation.—Granby Co. Successful Before Privy Council.

The Granby Consolidated Mining and Smelting Co. has been successful in its appeal to the Privy Council regarding the Cranberry District coal rights on Vancouver Island according to a cable to the company's solicitors in Vancouver, B. C. The issue of this litigation, it should be explained, is the coal in sixty acres of land acquired with other blocks of land some eighteen months ago and in the opening up and operation of which the Granby Company has invested considerable capital. As a result of the company's enterprise what is known as the Cassidy Collieries, the best equipped of their kind in the Canadian West, exist and from this source it is proposed taking the coal to supply the new by-product ovens at Anyox, which will solve the problem of obtaining coke for the large smelting plant at Anyox.

To revert to the matter of litigation, the case which has had a favorable outcome to the Company was brought by a Chinaman, Bing Kee, who asked that he be declared the owner of the coal rights in the sixty acre tract referred to. In 1905 Bing Kee purchased the property from the Ganner Estate, the trustees for which are Angus Mackenzie and Charles Wilson, two prominent citizens of Nanaimo. Subsequently the Ganner Trustees applied for the coal rights and obtained a Crown Grant to them. The Granby Company purchased the Crown Grant from Messrs. Mackenzie and Wilson for $45,000 and Bing Kee entered action to have it declared that his deed included the coal. Unfortunately for him the deed has been lost and the evidence appeared to indicate that only the land was intended to be sold. While, however, Bing Kee's suit is dismissed the Granby Company's troubles in regard to this coal are not ended. Another Privy Council decision affecting the same property continues a lis pendens filed by the E. & N. Railway Company, which claims that the Provincial Crown Grant to Joseph Ganner is invalid on the ground that the same property was granted to the Company by the Dominion Government as part of its subsidy for the construction of the Island Railway. The action of the E. & N. Railway Company has not yet come to trial. The Granby Company applied to the Supreme Court of B. C. for right to register title to the land and the coal purchased from the Ganner Estate but it was held then, and the judgment now is sustained by the Privy Council, that the lis pendens shall continue until the trial. The Granby Company, however, has a third appeal to come before the Privy Council, the contention of this case being that the E. &. N. Railway Company has failed to add the Attorney-General of the Province as a defendant in the suit, it being argued that this is a fatal omission as it is the Crown Grant which he issued which is under attack.

The employees of the Canadian Western Fuel Company will receive an advance of 25 cents a day in their wages as from the 1st of September 1919. This has been announced officially as follows:—

"The request of your Committee for an increase for the employees of the Company on account of the increased cost of living has been given due consideration. To assist in meeting this condition the management will put in effect on September 1st an additional bonus of 25 cents a day. This bonus will remain in effect until such time as the cost of living shall be reduced a like amount.

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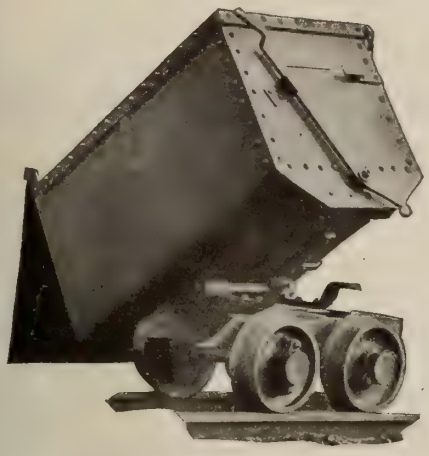

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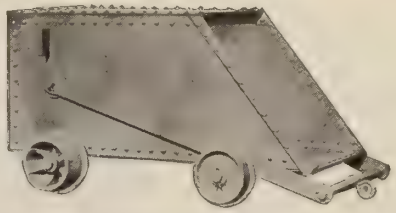

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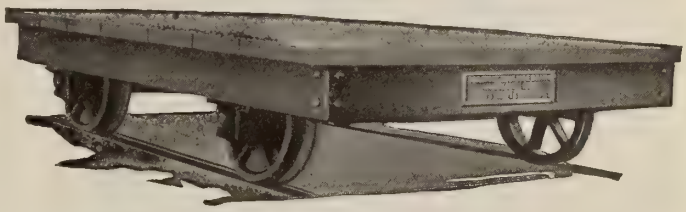

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"In this connection attention is called to the fact that the basic scale for both tonnage and shift rates is higher at Nanaimo than in the competitive districts. The management hopes that it will continue to have the co-operation of the employees in its efforts to increase production and in maintaining the high standard of Nanaimo coal."

D. T. Bulger, of the Dominion Department of Labor, has concluded an inquiry into allegations by some of the miners of Nanaimo District that the Canadian Western Fuel Co. was not paying wage increases granted by the Cost of Living Commission as compensation for the fluctuations in the cost of living prices since September, 1918.

That the men who made this charge misunderstood the situation was learned by Mr. Bulger, who explains it as follows: "For the quarter ending December 31st, 1918, the increase was 2¾ cents a day; for the quarter ending March 31st, 1918, 2½ cents a day; and for the quarter ending June 30th, 1919, 14½ cents, making a total increase since September 30th, 1918, of 19¾ cents a day. Through erroneous statements the impression was gaining headway among the miners that they were entitled to 19¾ per cent increase on their base rate instead of a day basis and consequently many believe that they were being victimized by the companies out of increases to which they were justly entitled."

Neither the Canadian Western Fuel Co. or its employers are parties to the arrangement made last year between the Island Operators and the Mines Committees of the various districts for the adjustment of wages by the Cost of Living Commission based on the fluctuations in the cost of living prices, and for this reason together with the fact that their rates

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in many instances are higher than those paid in other localities, do not think they should be penalized by paying the increases awarded by the Commission until the rates being paid by other companies are on a par with theirs.

Assurance has been received by Mr. Bulger from the Canadian Western Fuel Co. that any increase in wages by other companies in excess of theirs will be met promptly.

Mine Surveyors Must Be Certificated.

In conformity with an amendment to the Coal Mines Regulation Act passed at the last session of the British Columbia Legislature all plans filed with the Department of Mines hereafter, as provided by the Act, must be prepared by a competent and properly qualified man holding a certificate under the provisions of the Act. From the 1st of October no plans will be accepted unless prepared by a person who has had two years practical experience in surveying mines or is the holder of a diploma in scientific and mining training, after a course of study of at least two years at an educational institution approved, and who is competent to make an accurate survey of the workings of a coal mine and to connect such survey with a surface survey, etc.

REGULATIONS OF BRITISH COLUMBIA C. M. R. ACT CONCERNING WINDING ROPES AND CAGES.

Rule 27 of Section 91 is amended by adding the following:

"All cage chains in general use shall be annealed once at least in every six months, and detaching hooks shall be cleaned and refitted once in every three months."

Rule 28 of Section 91 is further amended by adding the following paragraph:

"Every winding-rope shall be given a bath in hot oil before being installed. Every winding-rope shall be recapped at intervals of not more than six months in accordance with regulations made under this Act, and no winding rope which has been in use for more than two years or which has been spliced shall be used for raising or lowering persons."

COAL PRODUCTION IN ALBERTA.

By the courtesy of Mr. John T. Stirling, Chief Inspector of Mines for Alberta, we have received the following figures of the coal output of Alberta during the first half of the current year, with a comparison of the figures of the first half of 1918, as follows:

1919.	
Domestic	799,724
Bituminous	1,227,988
Anthracite	41,411
Total output	2,069,123
Briquettes	46,822
Coke	14,599
1918.	
Domestic	1,320,143
Bituminous	1,502,031
Anthracite	75,776
Total output	2,897,950
Briquettes	53,424
Coke	17,963

This shows a reduction for the year 1919, which has been caused through labor conditions

:-: EDITORIAL :-:

THE COBALT STRIKE ENDED.

It is with much pleasure that we hear of the ending of the strike of the mineworkers at Cobalt.

No good obejct is to be gained by discussing the causes of the strike now that it is fortunately discontinued, but it may properly be observed that the strike was not justified by any grievances arising out of the working conditions of the industry, and was called to enforce recognition of a labor union alien in origin and alien in policy to the ideals of Canadian citizenship.

The Mine Managers' Association is to be congratulated on the proper stand it has taken and maintained against the political aims of a few men who are more concerned about the extension of the influence of United States labor organizations to the new and opulent mining camps of Canada than they are about the effect of their confessedly political plans upon the economic progress of Canadian industry.

The strike was settled, as this Journal intimated it could only be settled, by a representative committee of men from all the mines affected, a possibility that the Mine Managers' Association always held out.

As is often the case, during the progress of the strike the original leaders found themselves eclipsed by more thorough-going extremists, who became more vociferous as their proportionate numbers were increased by such workmen as were able leaving the district.

Much credit is due to the Returned Soldiers' Committee, which, although its efforts were temporarily nullified by the passing dominance of the radicals—who compelled the miners' leaders to go back on their undertaking—formulated the conditions on which work has been resumed.

It is reassuring to find the tremendous power which is reposed in the organizations of returned soldiers exerted against undesirable importations into Canadian life. The safeguard to the security of our national fabric is brought most clearly into relief where, as at Cobalt, the ideas of the returned men come sharply into conflict with the political aims of men who not being Canadians and having no stake in this country, have nevertheless been successful in temporarily depriving others of their means of livelihood, and in stopping the mining of silver during a period when the need for its production is sufficiently evidenced by the high price the market is willing to pay for it.

THE INDUSTRIAL CONFERENCE.

The provisional lists of those who are expected to attend the conference of representatives of Canadian industrial activities shows a most catholic selection of diversified interests, so diversified in fact that it will be a cheering sign of the times should any common agreement on principles be found possible.

We venture to forecast that the first concrete problem which the Conference will be called upon to consider—and not necessarily to solve, for some things are too difficult even for conferences—is the provision of remunerative employment in some of the pivotal industries of Canada during the coming winter.

If the Conference expends its united wisdom on academic discussion of the very debateable items of the draft agenda, many platitudes will be exchanged, some steam will be blown off by representatives of both capital and labor who will feel that the situation demands eloquence, but the root of the matter will not be exposed.

Canadian industries—that is such industries as serve by assembling the raw materials and manufacturing therefrom some necessary of life, and are not purely engaged in exporting the irreplaceable resources of our country—cannot compete with industries more favorably situated, and unemployment is on the increase.

It is too often forgotten by leaders of labor that some of our most basic industries in Canada, industries whose prosperity or decline involve influences that ramify to every quarter of our economic situation, are really bonused industries, buttressed, and we believe very properly buttressed, by protective tariffs and other forms of national assistance. This in itself is an admission of economic disabilities accompanying the as yet juvenile and undeveloped character of our industries, the geographical position of our coal deposits, and the choice which Canada has made to be an independent political state of North America.

Under these limiting conditions Canadian industry can only prosper by an agreement of both parties to the industrial contract to work together for Canadian interests, always keeping in mind our national limitations, which are opposed to and confronted by an energetic opulent and populous neighbor, a nation possessing unprecedented natural resources, with whom we desire to live in peace, as we have lived for a hundred years, but whose political or industrial guidance we do not accept.

Herein lies the danger of the propaganda of international unionism when it is advocated with such enthusiasm that it loses sight of the struggle which many Canadian industries have had to make, and must still make, to meet the aggressive commercial competition of the United tSates.

The cold truth is that a number of Canadian manufacturing industries, particularly the steel and metal industries, are facing an extended period of unemployment with winter approaching, and the most pressing item upon the agenda of the Industrial Conference at Ottawa is how to lessen the costs of production and how to increase the volume of output, and these vital considerations should take the precedence their actual importance calls for over the relatively secondary and political considerations that form so large a part of the matters now outlined for the consideration of the Conference of next week.

THE CLOSE OF THE STRIKE AT COBALT.

The striking workmen and the Mine Managers' Association at Cobalt, aided by local business interests, following the splendid, though unfortunately unsuccessful attempt of the Returned Soldiers' Committee, to bring about an amicable understanding, have now got together and work at the mines has been resumed, the following statement of the Mine Managers' Association being the basis of agreement:

"To the Committee of Employees, Cobalt:

"Since our recent meeting with you, the managers have carefully considered the points brought forward, and agree on the following statement:

"In regard to the wage situation, the main contention appeared to be that while the bonus system was favorably regarded, you believed the base wage was too low. Your reason for this was that in the event of a considerable drop in the price of silver, the low paid married men could not meet the present cost of living.

"To meet this objection we will strongly recommend to our directors as soon as the men return to work, if they do so without delay, that the base wage be raised fifty cents per day for all occupations and that the bonus start on 80 cent silver instead of on 60 cent silver as at present.

While this does not mean an increase in wages, it does mean an added security against a drop in the price of silver. This change would put the base wage of the miner on a par with the base wage in other large mines in this country and in addition the miner here would receive $1 per shift bonus on the present price of silver.

"Regarding hours of labor, the Ontario Government has enacted that eight hours at the face constitutes a day's work underground. We do not consider that eight hours labor is any more than a day's work. The employers have more to complain of in this respect than the employees, as it is a well-known fact that the efficiency underground has dropped very materially since the war started and this leads to corresponding increase in the cost of production. Consideration must also be given the fact that the Saturday night shift underground usually works five or six hours instead of eight.

The surface men working nine hours are on day shift every day. There is no good reason for changing this, as it is a well-known fact that most men prefer a nine-hour day shift to changing shifts and working eight hours at night. This is no time to talk about decrease in hours of labor. The whole world realizes that the output per man must increase if the cost of living is to come down.

"Regarding Sunday labor, you will realize that there are some operations that must be carried on continuously and also that unless certain jobs are done on Sunday, it would of necessity throw many men out of employment during the week. We have not found that the men employed in these operations generally object to Sunday work if they know it is necessary and in fact we often have applications for such. We shall endeavor to eliminate Sunday labor to a very minimum and if a man objects to it we will try to change him to another job which does not necessitate such work. Also, if a man must work on Sunday he shall have the right to have a day off on compensation during the following week. If Sunday work were paid for on an increased scale, the tendency would be to neglect repair jobs during the week with a consequent loss of employment to the regular workers.

"As soon as possible after a full crew has returned to work we shall ask the men to decide whether they wish to put in operation the plan of collective bargaining already outlined to your committee. Unless it is accepted in good faith by the men, it will not be inaugurated, because it would be a failure without their sincere co-operation.

"The outline of the scheme is as follows: The employees at each mine will elect an Employees' Committee from employees at that mine to discuss with their management questions concerning that individual mine. These several Employees' Committees will elect from their numbers a Central Council, which the companies will recognize as representing the employees of the district. A committee of managers will meet the council and deal with all general questions affecting the camp as a whole, such as wages, hours, and general working conditions.

"This council could very well consider the advisibility of starting a system of sickness insurance and some scheme for lowering the price of commodities to the workers. Both these questions would receive sincere consideration by the companies and it is believed that some satisfactory results would follow.

"It is hereby agreed that all workers may return to work as positions are available.

"TEMISKAMING MINE MANAGERS' ASSOCIATION.
H. H. Kee, President.
3rd Sept., 1919.

Work cannot be immediately resumed, as pumping has, in some instances, been discontinued during the strike and the mines must be relieved of an accumulation of water consequent on the stoppage of pumping and made larger by the steady rains of the past few weeks.

The president of the Mine Managers' Association states that the date of resumption of work will depend on the conditions existing at the individual mines, which will, of course, be dealt with by the several managements as quickly as possible.

"Canadian Mining Journal," with "Iron & Steel of Canada" will be "at home" to all visitors in Booth 138 at the National Exhibition of Chemical Industries, September 28th, at the Coliseum and Armories in Chicago.

It is understood the Patricia Mining Company, Boston Creek, Ont., is in the market to purchase complete new outfit of surface mining-plant and reduction plant to renew the loss which it recently experienced through forest fires, which destroyed all the mine buildings.

Dr. T. L. Walker, Director of the Royal Ontario Museum of Mineralogy, and Mineralogist of Toronto University, is visiting British Columbia. He explains that his presence in British Columbia is for the purpose of obtaining specimens for the Ontario mineral collection and to keep in touch with mining development in this province.

Charles E. Taylor, chief geologist to the Imperial Oil Company, has announced that drilling for oil will be started at once at a point to the southwest of Lethbridge, Alberta. Twelve parties under Mr. Taylor have been exploring the foot-hill section of Alberta since the early spring and as a result the point indicated has been selected as the most likely for the obtaining of the results desired.

Oil In The Western Provinces

By N. C. PEARCE.

Seriously hampered by exceptional weather conditions, drilling work in the Northwest Territories will have to be postponed until next year. This is the latest word from the North. Two drilling rigs were expected to be sinking this season, one at Great Slave Lake, the other on the rim of the Arctic Circle, at Fort Norman on the Mackenzie River.

This summer has been very wet, and to the conditions brought about by heavy rainfall have been added unanticipated troubles connected with getting the rigs around the long rapids of the northern rivers. The Government has sent in bridging and engineering parties to assist the Imperial Oil Company's men and now the best that can be hoped for is that the rigs will be on their locations before cold weather sets in, ready for drilling next Spring. The Great Slave Lake crew will come out this Fall; the Mackenzie River crew will winter in the lonely wastes of the Arctic.

As to drilling, the Summer has had disappointments for the oil men, but the efforts of the many geological parties scattered over Alberta and the North West Territories have been distinctly successful in the amount of good work accomplished. Advance reports from the geologists of the Imperial Oil Company appear to eliminate certain districts and to bring favorable attention to others. The private and Government stratigraphical work is far from completed for the season. When full reports are in there will remain to be done a detailed co-ordination of all examinations.

Meantime, until this co-ordination of reports makes available a full statement of this year's findings, a summary of conditions and developments in the Province of Alberta and the Territories should be worth while.

A great deal of the information for this article was secured by personal investigation on the ground by the writer. Mr. T. O. Bosworth, the Imperial Oil Company's chief geologist, and Mr. C. E. Taylor, their Western production manager; Mr. J. S. Stewart of the Dominion's Geological Survey, Mr. J. B. Tyrrell and others were sources of valuable data and opinion.

Broadly, there are two formations of the Province of Alberta, the North West Territories and certain sections of British Columbia and Saskatchewan that contain oil—the Cretaceous and the Devonian.

These formations are each thousands of feet thick. Throughout the southern and populated parts of Alberta the Cretaceous is the surface, while the Devonian is burried below at depths reaching to 5,000 and 6,000 feet. Well to the north the Devonian comes to the surface, out-cropping first at Vermillion Chutes on the Peace River and down north in the territories it forms the surface over very broad expanses of country.

It will thus be seen that in the populated parts of the west the hopes of oil must be concentrated on the Cretaceous, while in the parts that are difficult of access promise is centred on the Devonian.

In the vicinity of the town of Peace River, a section that has received a great deal of prominent notice in recent months, the Cretaceous is 1,100 feet thick and lies in gentle unconformity upon the Devonian. The drills in several places have explored the Cretaceous with no striking results, and two drills are now penetrating the Devonian with a progress that is, of course, being eagerly watched.

Taking the oil possibilities of the west, district by district, we will examine what investigation tells.

There is little chance of oil being found in the central part of the province of Alberta. In the narrow strip that extends north and south and takes in Edmonton, Calgary and McLeod, the country is in the bottom of a synclinal trough, the strata lies almost flat, while well away to the east, south and west they incline upwards. Deep wells have been drilled in this strip without oil being obtained. The depths of some of these bores are, Morinville, 3,350 feet; Edmonton, 1,800 feet; Wetaskiwin, 1,511 feet; Ponoka, 2,257 feet; Calgary, 3,414 feet; Gleichen, 2,795 feet.

McArthur No. 3 now being Drilled at Peace River.

Traces of oil, however, were found, and gas. No one can say that in this strip oil will be found, but conditions are decidedly against it. What lies below the Cretaceous is practically a sealed book.

Taking now the eastern part of Alberta, some folding has been found in the Cretaceous, which is largely littered with debris of the ice sheet. Those folds, being little exposed, have escaped attention until recently. There is a slight similarity to the oil bearing anticlines of Wyoming and a deep test hole is now being bored by the Imperial Oil Company. This is on a fold near Czar, on a C.P.R. line. The well will be sunk to the Devonian floor, the borings having the additional objective of geological knowledge of the lower stratas. While boring was to have started on this, the deepest hole in Canada, last June, it began only in August. Delay in shipping supplies was the cause. The total cost is estimated at $150,000; a steel derrick, 106 feet high, designed to carry a working strain of 250,000 pounds, has been erected. The hole will begin with 20 inch casing and finish with six inch casing, and will take 18 months to complete.

In this general region a number of wells have already been drilled but it is said that not one is located on a fold. The deepest is at Fusilier, just across the border in Saskatchewan, and it reaches 2,826 feet. There is no sign of structure here. Small showings of oil have been encountered, chiefly at Gratton and Viking.

A promising gas fold has been proven at Viking around a depth of 2,000 feet. There are at present nine wells with fairly large capacity, but not as great as the wells of the Bow Island field. The pressure is 730 pounds and some of them run four to five million feet a day. The extent of the field has not yet been limited and its possibilities are considered very good. There is also the likelihood of other fields being located in the same general neighborhood.

The Frontier Town of Peace River.

Coming down to the south border of Alberta interest naturally centres on the district of the Sweet Grass Buttes. Here there was almost feverish activity early in the war; the Cretaceous strata tilt upward and almost all the beds outcrop. In general the structure is a gently arched monocline, dipping towards the north. In some of the wells traces of gas and oil were found. United Oils No. 3, at Etzikom Coule, 30 miles north of the boundary, is the most important well. It went 3,705 feet and through the Cretaceous into the limestones beneath. At the base of the Cretaceous a 60-foot bed of sand was found, resembling the famous tar sands of northern Alberta. No commercial oil was found but plenty of gas.

To the north thirty-six miles at Bow Island, we find one of the most important gas fields in Canada, developed largely through the energy of Mr. Eugene Coste and his partners. There are here about twenty gas wells, running 2,200 feet deep, with capacities averaging six and a half million cubic feet a day, and with a gas pressure of 800 pounds. This field supplies Calgary and other cities. Medicine Hat has also developed an important gas field.

While the accumulations of gas are without doubt extensive and of great importance, the gas itself is dry. While just now hopes of extracting gasoline from the gas fields of southern Alberta are based on rather slim promise, there is no doubt that this resource will all ultimately be of great value. An interesting fact is the presence of Helium, which is said to be a one per cent content, a percentage comparing very favorably with most of the American gases available for use in inflating airships.

Over in the extreme southwest corner of Alberta, on Waterton Lake, there is the oldest oil-field of Alberta. Twenty years ago seepages were found and several wells drilled to 1,400 feet. In two a fair amount of oil was secured. One, the Lineham, is said to have flowed 100 barrels a day. This summer this well was cleaned out and many barrels of oil baled. Arrangements for drilling a new well alongside this old producer are under way. The presence of oil here is decidedly surprising, for the wells are really within the Rocky Mountains. There is great faulting and overthrusting, the crystalline rocks having been pushed over the Cretaceous. The oil appears in pockets in the older rocks.

Three Creeks Well now being re-opened at Peace River.

Along the foothills of the Rockies we find the Cretaceous tilted upward and crinkled into sharp anticlines. This fold-belt has a width of ten to twenty miles and a length of 800 miles from the boundary northward. Geologists think that this foothill belt is one of the most promising in the west, but it requires

very careful examination. There is excessive faulting, crushing and other disturbance and the structure is often difficult to determine.

Wells placed on the faulted rocks would, of course, be wasted, and wells placed on the anticlines have to be precisely located, owing to the steep flanks of the folds. The outer folds are generally the least steep and the most favorable. As an illustration, the Turner Valley anticline might be mentioned; its dip on both flanks is forty-five degrees, three-quarters of a mile from the axis.

In the foothills some fifty wells have already been drilled, a few of them with regard to structure. These wells cannot be even said to have tested the southern section of the foothills belt, while the Edmonton and Peace River sections are utterly virgin land. The foothill wells are scattered from the boundary to Rocky Mountain House, but cluster chiefly in the Okotoks field, which has five producing wells, with a total yield of about 75 barrels a day. Last year the production was 18,000 barrels of very high gravity oil—some of it almost pure gasoline. The oil is found at 3,000 to 4,000 feet. At the Dingman well there is a high flow of wet gas from which the gasoline is now being extracted by the first plant in Canada.

At this time the most extensive geological surveying in Canada is being done in the foothills. On the work of the Government stratigraphists a half dozen Imperial Oil parties, and several other parties, are basing their examinations. Some very promising determinations have been set down, a number of gas and oil seepages found and numberous anticlines mapped.

Down the river from the town of Peace River for ten miles a number of wells have been drilled. The first was put down in 1915-16 for J. D. McArthur and a syndicate of fifty associates. This syndicate has drilled three wells and the third of these is now into the Devonian limestones. The Tar Island Oil Company have also a well into the limestones, both holes being now at 1,200-1,300 feet. Close to the contact an occurrence of water, highly agitated by gas and in dangerous proximity to loose and crumbling sand, had to be met and defeated. This has been a great problem for the drillers. The Victory Oil Company are putting two wells also down into the Devonian and there is talk of other holes, at present idle, being deepened.

The oil so far secured is in encouraging quantities and from some of them several barrels a day were baled out. One is reported to be capable of twenty barrels daily. It is a heavy, tarry oil, occuring near the bottom of the Cretaceous. A relation with the famous tar sands of the Athabaska has been hinted.

The Peace River field is 140 miles east of the nearest known folding in the foothills. The structure has been mapped three times by geologists, and a very gentle structure with a slight westward dip noted.

The Devonian is not exposed anywhere at the surface in the neighborhood of the field but it is known by geologists that it is almost certainly folded, and to the north it contains oil. The difficulty of course, is to strike folds that are hidden from view.

If the wells were spread much further apart, and the Smoky River section bared, the chances of hitting something around the town would be bettered tenfold.

In a two-hundred mile stretch between the Peace River and the Athabaska there is a good looking field about which little is known but is probably underlain by tar sands.

To come to the tar sands, it may not be generally appreciated that in the vicinity of McMurray on the Athabaska River, Canada has the largest natural oil exposure in the world. But have these sands economic importance?

They exist in a bed of ordinary sandstone, 100 to 200 feet thick, saturated almost completely with heavy, asphaltic oil. It contains 15 per cent of bitumen and yields 15 to 25 imperial gallons of oil to the ton when heated. The oil is low grade, with specific gravity of 25 Beaume, but on distillation it yields five per cent of gasoline. The area over which the tar sands are spread is, at the lowest estimate, 10,000 square miles, and may be more than 20,000 square miles.

Dr. Bosworth makes the very interesting calculation, based on the supposition that the economic elements of the tar sands can be secured and extracted, that the area is 15,000 square miles, the thickness 50 feet, and the yield 10 gallons per ton, that the famous sands contain three hundred thousand million barrels of oil. This quantity is only 500 times the world's annual production.

The thing is to get it, to get it away from the exposures. The Government drilled a test well at Pelican where it was hoped to strike the oil under a thick cover of clay shales. Drilling difficulties caused the hole to be abandoned. That was many years ago; in recent years at least six prospecting wells have tried to find the tar sands under a proper cover of clay shales. Three of these holes were along the Great Waterways railway and encountered the tar sands at 400, 600 and 1,000 feet, respectively. A fourth well at House River found the sands at 400 feet; the fifth and sixth were at Pelican, and at about 900 feet. None of these encountered commercial yields but no one, least the experienced geologist, is ready to condemn the whole region. If drilling for oil fails other methods for utilizing the tar sands will be tried. Gas has been proven here to exist in very large quantities. For twenty years there has been a heavy flow from the Pelican well, drilled by the Government. Later wells have proven it. At present far from population and railways its value lies in the future.

Now to discuss the northern parts of Alberta and the territories which the Imperial Oil hoped to explore with the drill this year but have been prevented from doing by weather and abnormal physical conditions. This is the country where in broad reaches the newer formations have been eroded, and the Devonian bared to view. Near McMurray and Fort McKay wells have been drilled without much success. Beneath the limestones there are thick deposits of red shales with salt and gypsum and the prospect of finding oil in the Devonian of this locality is not at all bright.

The Devonian is also laid bare at Vermillion Chutes, where there was some excitement in 1914-15. The initial venture of the late Lord Rhondda was here and, unfortunately it was not a success. Interests connected with his estate are now visiting the country and there is hope that they will show by new oil enterprises that they are not discouraged. The strata at Vermillion are almost horizontal and are beds of brecciated or fine limestone containing blobs of tar.

On Great Slave Lake are some of the most interesting oil indications in Canada. The shores are largely low and swampy but enough of the structure is visible to make clear that the beds are in gentle undulating

folds. On Windy Point, on the north shore, the most noticeable seepages of oil are found. Here a bed of crystalline dolomitic limestone has cavities containing a light, yellow oil. Oil rises to the surface of the water where the rocks are submerged, and on land are great pools of oil. At present it is not known whether any oil bearing beds lie below the one near surface. That will be determined by the drill next summer. The Imperial Oil men say that in the Great Slave region the oil showings are so widespread that it seems quite probable that oil fields will eventually be developed.

Northward even from here indications of oil are found in many places. Some of the chief seepages occur in the country beyond Fort Norman, on the Mackenzie River at the Arctic Circle, where, through an extensive region, the Devonian consists of deposits very favorable for the formation of oil. There are here 300 feet of black bituminous limestones upon which rest 300 feet of black bituminous shales. The shales smell very strongly of oil and in places there are large cliffs of them undergoing combustion on the surface. This bituminous series is overlain by a series of clay shales and sandstones and it is in these sandstones that the oil occurs. The structure is also favorable for the strata are folded into long, large anticlines. A preliminary test well was to have been drilled this year but is postponed until next spring.

It is considered by very conservative authorities that here, on the Arctic Circle, a number of oil fields must eventually be proved. This is a long way from civilization, and the average person will think that the spending of money a thousand miles inside a land of waste and wilderness is a crazy performance. But shrewd, expert men think the money will be well spent and are eagerly confident that if oil is found that they can get it out. It is a bold enterprise, there is nothing going on in Canada approaching it for daring.

Since the "Shell" Company's vain effort to get the oil monopoly of the north half of Alberta and a piece of the territories equally large, there has been far more interest on the part of the big petroleum people. Although the Imperial Oil Company's prospecting bill for this year will run around a million dollars, they have not got the field to themselves. Other interests have geological parties scouting the country but the nature of their operations makes quietness an easier matter.

Searching for oil is not solely the rich company's privilege. The small company, or the individual, has not the same facilities for checking and examining the geology of a province in one campaign but the same facilities for acquiring land are open. Leases are secured from a Dominion Land office at a cost of 25 cents an acre the first year and 50 cents an acre for subsequent years. The individual is limited to 1920 acres at a time but can secure as much as he wishes by using the names and assignments of relations and friends. Drilling must start at the end of the first year, and the cost of boring is deducted from rentals.

More has been learned this year of the oil possibilities of the Canadian west than during the previous ten years. Oilless areas are being eliminated and promising sections are being circumscribed. Actual drilling operations do not approach, in extent, the hopes of the more optimistic people, but it is most certainly true that great strides have been taken toward the production of a natural resource vitally necessary to Canada's growth.

MINING MEN MEET TO START ASSOCIATION.

Prominent Mining Brokers, of Winnipeg and the Twin Cities Organize.

Plans have now been completed for the formation of a Winnipeg Mining association to represent the interest identified with the development of mining in Northern Manitoba. The first preliminary meeting of those interested in the new association was held some time ago and plans were further developed at a recent meeting. The membership of the new association will include mine owners, owners of mining claims, large shareholders of companies already in existence, as well as brokers and financiers interested in the development of the mineral fields of this province. Another immediate purpose of this association will be to act as a central clearing house for all information as to the development of Manitoba mineral properties and to supervise and censor the issuance of authentic information and publicity regarding the development of the Manitoba mining field.

It is expected that the organization of the association will be completed at an early date then a bureau of information will be established in this city, where the public can seek and at all times secure accurate and unbiassed information regarding Manitoba mineral developments. The first meeting, which was of an informal character, was largely attended.

The officers elected were: President, J. Murray Baird; vice-president, John Beckman; directors, J. Murray Baird; John Connor, secretary Winnipeg Stock Exchange; W. Tobias.

Among those present, were: Edward McCarthy (St. Paul, Minn.), D. D. Shaw, R. R. Pattinson, L. W. Hicks, L. E. Blummer, J. M. Baird, E. W. Jackson, H. B. McTavish, J. D. Perrir, John Connor, N. Tobias, W. Pow, J. W. Harris, H. B. Montgomery, and E. E. Kain, of Minneapolis.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS.

Chicago Meeting.

September 22nd to 26th the American Institute of Mining and Metallurgical Engineers holds its Fall Meeting in Chicago. The Congress Hotel is designated as the convention headquarters and most of the meetings and technical sessions will be held there. For the gratification of the technical appetites a feast of upwards of a hundred and fifty papers have been prepared for discussion at this meeting.

The first of the social activities during the session will be the smoker at the Congress Hotel on Monday evening, and for this a lively programme has been prepared. The Committee in charge guarantees that at this smoker—in spite of the restrictions against 2¾%—any existing trace of coolness or strangeness between members will be absolutely annihilated. An inviting series of excursions has been arranged for the members and their wives. These include a boat trip to the Gary Steel Mills, one day in the LaSalle district with its zinc smelters, coal mines and cement plants; the East Chicago lead refineries, the oil refineries at Whiting, the tungsten and molybdenum plant of the Fansteel Products Company, the Milwaukee mining machinery manufacturies and the coal mines in Franklin and McCoupin Counties. Also arrangements have been made for the members to visit the various industrial plants of interest in and about Chicago.

Recent Developments In Wasapika Gold Area

By REGINALD E. HORE.

Encouraging results are being obtained by those who are developing gold properties in the Wasapika area, Sudbury Mining Division. Some account of this area was published in the July 9th number of the Journal. I have recently re-visited several of the properties and I found that where work is being done, the chances of developing profitable mines have been considerable improved.

The Wasapika property is particularly interesting as it appears to have the makings of a very big mine. The West Tree is developing a smaller but very rich orebody. It is significant that the vein

The West Tree Headframe.

matter just broken at the 100 level of the Wasapika is very similar in character to the ore that is being taken from the West Tree shaft. I saw no coarse gold where the Wasapika vein was first encountered at the 100 feet level, but the white quartz with its dark sericitic seams and with many small pyrite crystals and occasional grains of chalcopyrite has a striking resemblence to the veins which on the West Tree carry very high gold values I will be very much surprised if rich shoots are not found in the Wasapika deposit. As the cross cut has not yet passed through the vein the thickness and assay value of the deposit is as yet unknown. When the crosscut is completed it will take some time to drift north and south along the vein to develop it thoroughly at this level. Then it must be carefully sampled and assayed. No one knows what the results of samplying and assaying will be, and most people will prefer to wait and see before expressing an opinion as to the nature of the deposit. Being myself more interested in probabilities than certainties, I have formed an opinion after examining the ore and rocks at surface and in the crosscut. It is only an opinion, but it may interest

The Saw Mill—Wasapika Mine.

some readers of the Journal. It is that the underground work so far done indicates that the ore deposit is even bigger than it appears to be on the surface and the surface indications are that it is a big one.

The Wasapika shaft was started in the hanging wall rocks about 80 ft. west of the outcrop of the Ribble vein. At a depth of 100 ft. a crosscut is being driven towards and through the vein. At the shaft there are narrow quartz veins in the rock. Similar

A Glimpse of the Michikawakenda Lake from the Herrick Camp.

narrow veins were cut at intervals in driving east. At about 30 ft. a big vein was encountered and the face was in quartz when I visited the property. When I left the district on August 23rd another round had advanced the opening to a distance of 8.7 feet in the vein.

While development at the shaft is the chief activity at the Wasapika mines, progress is being made in other work. A saw mill is in operation and is proving very useful in squaring timber and cutting lumber

for building purposes. The mill is located close to the Wasapika power house. It supplies the needs of the Wasapika, West Tree and Herrick properties.

Transportation has been improved by the completion of the road to the Herrick property. Supplies for the Wasapika mine are brought to the west shore of Michikawakenda lake from the railway by team and thence by motor boat to the Wasapika. The cost of freighting has consequently been greatly reduced. Low water in some of the streams was causing the freighters much trouble on the water route, much heavier loads can be comparatively easily handled by wagons.

The West Tree

At the West Tree the sinking of the shaft is progressing rapidly under contract. A suitable head frame and power house has been constructed and a hoist installed. The contractors are encountering rich ore in quartz veins in the shaft. Very rich pieces of ore are of common occurence. The quartz is white with dark sericitic seams. The gold is partly along these seams and partly at some distance from the seams in the white quartz. Pyrite is abundant and chalcopyrite is often present in the ore. The pyrite is commonly in well formed crystals, while the more yellow chalcopyrite is in shapeless grains.

While development of the rich ore deposit is at present the chief activity at the West Tree, there are other and bigger deposits that will receive attention later. There is at present a natural desire to learn the nature and content of the rich deposits which have been found on either side of Upper Wasapika Lake and development will in the near future be largely under the lake. With rich ore on either side of the lake and another vein running into the end of the lake from the south, one may confidently expect interesting developments in the drive across.

Mr. Fitzgerald and the First Cores from the Herrick.

One of the Herrick Buildings.

Herrick.

At the Herrick, camp buildings are being constructed and a diamond drill is in operation. The wagon road to the property has been completed and supplies can now be brought in from Westree station on the Canadian National Railway by team at the cost of about 2c a pound.

The diamond drill has been set up west of the Herrick shaft and drilling has been started at a dip-angle of 60 degrees. If the vein continues vertical it should be encountered at a depth of about 450 feet. The drill is in lower ground than the shaft, about 30 ft. lower than the collar. When I last visited it, the drill was turning merrily at a depth of about 150 ft. Mr. Fitzgerald, who has the contract for the diamond drilling is largely responsible for the speed with which the Herrick end of the wagon road was completed. With a first class machine and experienced drill men on the job there should soon be several holes completed that will give information of great value to the owners of the property.

On the Water Route to Wasapika.

A View of the West Tree Headframe and Power House from the North.

Other Properties.

While most of the work being done is at the Wasapika, West Tree and Herrick there are other properties on which some work is being done and several other promising properties which merit attention. At the Atlas, camps have been built and a small force is at work. The Saville-McVittie, a promising property, is still idle. At the Churchill, a little work is being done, but development is not proceeding as vigorously as the property merits. The Gold Corona or Queen of Sheba is also still idle. Prospecting has been begun on the Anzac (now Wakenda) properties which lie north of the Herrick. Further west, a number of claims are being prospected. Walter and John Knox have several men at work on claims west of Michikawakenda lake.

Nova Scotia Notes

Dominion Coal.

The production of the Glace Bay collieries of the Dominion Coal Company in August was 240,744 tons, comparing with 288,781 tons in August 1918. The output shows a slight decrease from the previous month, July which showed a production of 249,396 tons.

For the first eight months of the year the output was approximately 2,029,000 tons, comparing with 2,257,000 tons in the corresponding period of 1918, showing a decline for the year of 232,000 tons.

While the further release of requisitioned ships will permit of more steady working of the collieries during the remainder of the season of open navigation, it does not appear likely that the aggregate outputs of the Cape Breton collieries for 1919 will much exceed three million tons, if at all. With the exception of the strike year 1909, it is necessary to go back to 1901 to find records of production so low as they promise to be for 1919. The Glace Bay collieries in 1918 produced 3,272,000 tons.

The output by collieries during July and August is shown below:

Mine	Aug.	July.
No.1	25,953	26,766
No. 2	47,835	49,756
No. 4	26,117	27,552
No. 5	5,841	6,442
No. 6	17,229	18,712
No. 9	16,406	22,194
No. 10	8,249	8,613
No. 11	13,578	13,031
No. 12	16,365	16,625
No. 14	13,724	11,836
No. 15	12,255	12,527
No. 16	16,660	12,468
No. 21	12,159	11,681
No. 22	12,373	11,193
Total	240,744	249,396

It is understood that a new shaft is likely to be put down by the Dominion Coal Company on the seashore at Glace Bay to serve the submarine territory of Caledonia (Dominion No. 4) Colliery, and also to tap the Emery Seam underlying the Phalen Seam, which is worked out in the land area tributary to the Caledonia Shaft.

The Caledonia Colliery is one of the oldest mines operated by the Dominion Coal Company, the colliery having been commenced in 1866. As an example of excellent workmanship, it may be mentioned that the Caledonia coalhoist was brought from the Gardiner Mines in 1870, after being used there, and is still in daily use. The engine was made by Coupe, England.

The plans for the new shaft indicate the further development that must take place in the Glace Bay and other submarine coalfields in Cape Breton in order to win the submarine coal. Not only much larger shafts, in diameter, but much deeper shafts, will be required in the future, in order to win the underlying and unworked seams. No really deep shafts are as yet sunk in the Sydney coalfield. The shaft contemplated would be about 600 feet to reach the Phalen Seam, the Emery Seam underlying at a further depth of about 160 feet.

A shaft sunk to a depth of less than 1,500 feet near the present No. 2 Colliery of the Dominion Coal Company would include about seven workable seams of coal, aggregating nearly forty feet of coal in total thickness.

The seams are so spaced that they can be worked without seriously interfering with one another, if the workings are properly laid out and ordinary precautions are taken. This section is substantially the same as underlies the workings in the Phalen Seam at Caledonia Colliery, and indeed the whole of the submarine coalfield in the Glace Bay district.

A new shaft, now being sunk, is approaching completion between collieries Nos. 1 and 2, which, like the proposed shaft at Caledonia, is being sunk to facilitate the operation of the submarine areas, and to shorten the distance the workmen have to proceed from the surface to the working face.

Nova Scotia Steel and Coal Co.

The output of the Scotia Collieries for August, compared with August 1918, was as shown below:

	Aug. 1919 Tons.	Aug. 1918 Tons
Princess	14,347	10,454
Florence	18,250	12,884
Scotia	7,544	6,598
Jubilee	10,794	11,521
	50,890	41,457

The collieries worked full time throughout August, the Jubilee Mine being the single exception, and losing only one day.

Coal was banked out to equalise shipping opportunities, but it is expected that stocks will be completely lifted before Winter commences.

At the new mine near Point Aconi coal is now being hoisted to the extent of about 25 tons daily. This quantity will, of course, be increased as development proceeds. So far the coal produced is being stored on the ground awaiting the building of a railway line to the new colliery site.

U. S. Bureau of Mines Auditorium.

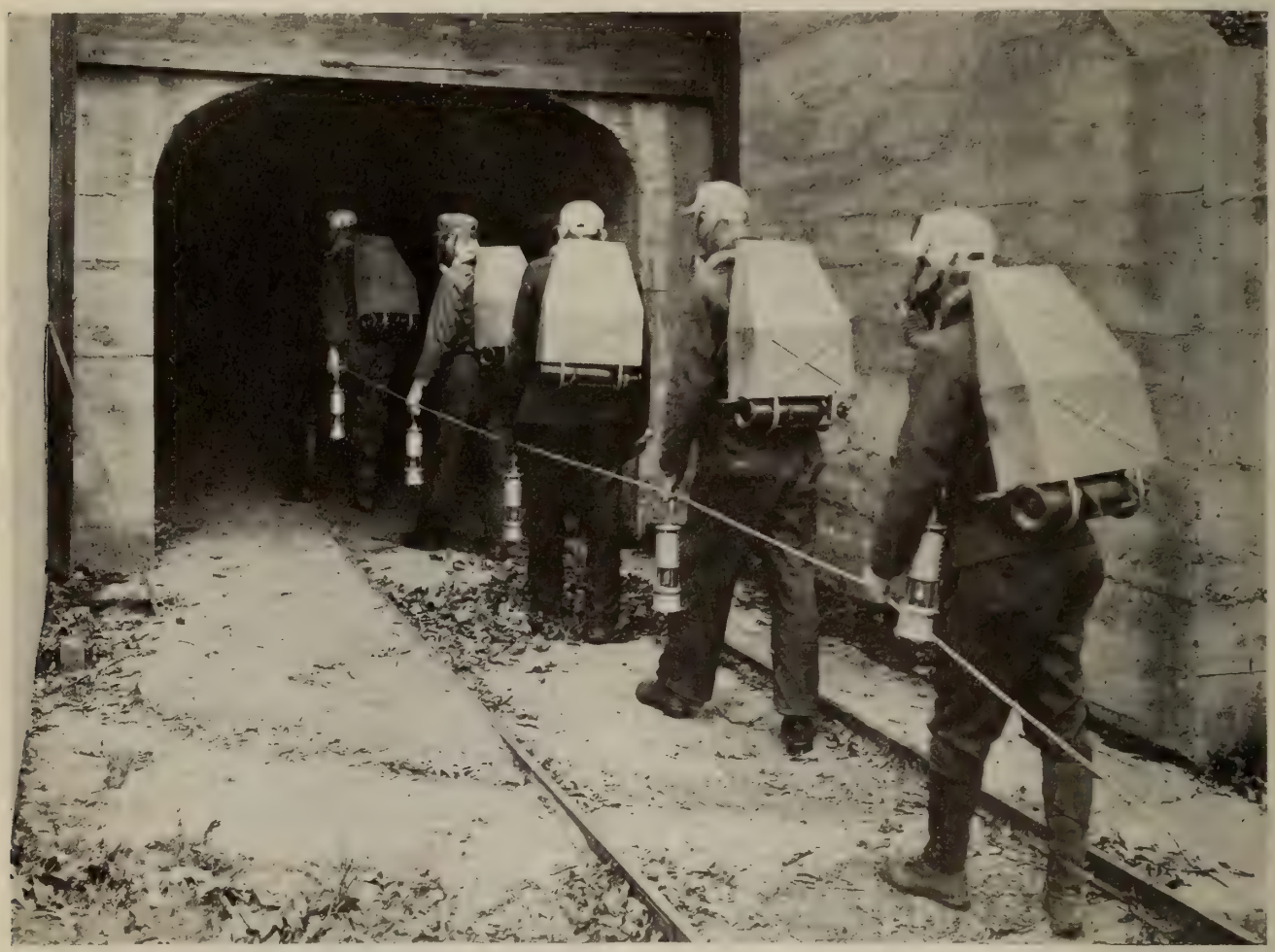
OPENING OF N. S. BUREAU OF MINES RESEARCH LABORATORIES.

The new laboratories of the Interior Department's Bureau of Mines at Pittsburgh, costing more than a million dollars, are to be dedicated on September 29, 30 and October 1, with appropriate ceremonies in which the mining and metallurgical industries of the country are to take part. The program for the three days has been arranged by the Bureau of Mines in co-operation with the Pittsburgh Chamber of Commerce.

One of the biggest features of these ceremonies will be the Nation-Wide First-Aid and Mine-Rescue Contest to be held during the last two days. Already nearly 100 teams from the coal and metal mining companies throughout the country have entered the lists and more are expected by the time the entries close.

On October 1, there will be a holiday for the miners of the Pittsburgh district and thousands will attend this National Meet and witness the awarding of the prizes to the winners.

In addition to the usual prizes for these contests, the Joseph A. Holmes Safety Association, an organization created in 1916 in honor of the memory of the First Director, for the purpose of giving recognition to persons who had performed meritorious and heroic deeds in the saving of human life in the mining and metallurgical industry, or who had developed some safety appliance to further the saving of life in those industries, will make its first awards. Dr. Van H. Manning, President of the Association, will announce the list of recipients of diplomas and medals and recite the deeds for which they are presented. The committee on awards has recommended that twelve gold medals be awarded all for heroic deeds performed by miners in coal and metal mines in efforts to save the lives of other fellow-workmen. In several instances where men lost their lives in endeavoring to save others, the medals will be awarded to their nearest living relative. It is the intended that this organization serve the mining industry in the same manner as the Carnegie Hero Commission attempts to serve industry generally.



View of the New Oxygen Breathing Apparatus for Mine Rescue Work perfected by the United States Bureau of Mines.

Speaking of the accident condition generally in the mining industries and of the outlook, Dr. Van H. Manning, Director of the Bureau of Mines, says:

"I am often asked, 'What has the Bureau of Mines accomplished in saving of human life in the mines?'

"It is difficult to say that so many miners might not have been killed if it were not for the Bureau of Mines, there are so many varying factors involved. I may say, however, that if you consider the prevailing average death rate in the mines for a period of years

before the Federal government took up this work, and compare it with the average fatality rate since the bureau was created, you will find that 5,000 less miners have been killed. In other words, had the old fatality rate been maintained through the last few years, 5,000 more men would have lost their lives.

"I am of the opinion that the statement of 5,000 lives saved is a conservative one, for it must be remembered that the situation was gradually becoming worse in the mines, and who knows but what there might not have been 7,000 or 8,000 lives lost. We also have to take into consideration that, thanks to the many improvements in life-saving methods and the greater understandings of the causes of accidents, that the tide has definitely turned and that this saving of 5,000 human beings within a few years will be accentuated and increased as the years roll on until we can show several times 5,000 lives saved.

"Whatever statisticians attempt to make out of these figures, however, they may endeavor to twist them, it is indeed a glorious record of human progress. Five thousand lives saved! Perhaps, 2,000 less widows. At least 3,000 children who still have fathers.

Mr. James McEvoy of Toronto is on his way to the Belcher Islands, Hudson Bay, to examine iron ore deposits.

Special Correspondence

NORTHERN ONTARIO.

The result of development work on the Clifton-Porcupine property in the Porcupine district is arousing a good deal of interest. Work which got well under way only a few weeks ago has already resulted in blocking out considerable commercial ore, according to late reports from the property.

The Clifton-Porcupine is understood to be well-financed, the property being all paid for and with no bonded indebtedness. Ample funds are said to be in the treasury with which to carry out the development program outlined. The interests behind the enterprise have shown genuine ability and intergrity in the past, and it is their belief that their property will develop into a producer.

The property is situated immediately south of and adjoining the Dome Mines. Success at this point would considerably enlarge the so-called Dome area. As a consequence of this the Clifton-Porcupine is the center of more than ordinary interest.

View of the New Oxygen Breathing Apparatus for Mine Rescue Work perfected by the United States Bureau of Mines.

"Canadian Mining Journal," with "Iron & Steel of Canada" will be "at home" to all visitors in Booth 138 at the National Exhibition of Chemical Industries, September 22nd, 28th, at the Coliseum and Armories in Chicago.

Although official advice has not yet been obtained, it is learned on good authority that the Lake Shore Mine has a further construction program under contemplation. It is intimated that the necessary steps may be taken in the near future to prepare for the installation of additional mill equipment at the end of the coming winter.

The present mill of the Lake Shore has a capacity for treating between 60 and 70 tons of ore daily. The grade of the ore formerly treated has averaged around $25 to the ton. Also, the physical condition of the mine is understood to be such as to insure ample tonnage of such high grade ore for considerable time to come. At the same time, as in all gold mines, outside of the high grade usually lies more or less large bodies of low grade. The Lake Shore will probably prove to be no exception to this rule. Thus, instead of mining high grade ore entirely during the early years of its career, and leaving low grade only for the balance of its life, it is the usual practise to provide the requisite facilities for mixing the high grade with the low grade and by so doing place the mine on a production basis that will at once be highly profitable and remarkably uniform.

Opinion seems to be that by so doing the Lake Shore can add to the volume of output, add to the life of the mine and without difficulty go on a dividend basis somewhat higher than the quarterly disbursements of 2½ per cent before the labor strike caused the mine to close.

According to unofficial reports from the Fort Matachewan district the Matachewan Gold Mines Company, owners of the Otisse, have acquired another property lying adjacent to their own. The new property is stated to have previously been controlled by R. Norrington, who is associated with the Allied Gold Mines Company.

A second shaft is being sunk on the Otisse property of the Matachewan Gold Mines Company. The point selected for the new shaft is about a thousand feet from the original workings and along the strike of ore deposition.

The first shaft put down on the Otisse reached a depth of 170 feet some time ago, and, as stated recently, lateral operations are being conducted in three directions at that depth. This work, it is understood, will be continued, the sinking of the new shaft being but an enlargement of the exploration and development program.

In a number of instances, according to present plans, a number of old Cobalt properties which have lain in idleness for the past several years will be re-opened soon after the ending of the Cobalt strike.

The high quotations for silver is having a salutory affect, and, following the re-establishment of harmonious conditions, not only will the big producing mines be operated with increased vigor, but practically every small or idle property will probably be examined with increased care and explored in a manner commensurate to the increased possibilities which they offer as a result of the strong position which the white metal now commands in world finance.

The re-opening of the Porcupine V.N.T. in the near future, and the development of the known series of gold-bearing veins on the west and the north part of the property seems to present possibilities not surpassed by any other property in the Porcupine district, with the exception of the Hollinger, McIntyre and Dome Mines.

Already to a depth of 600 feet the Porcupine V.N.T. has been found to contain large quantities of commercial ore on the main vein worked to date. A series of veins occur in close proximity on which only surface work has been done. Not only does the property border on the Hollinger Consolidated and share similar formation, but it also borders on the Porcupine Crown, the main vein of which dips onto the V.N.T. at depth.

The dividend of 5 per cent declared by the Nipissing Mining Company, payable October 20th, will call for the disbursement of $300,000 and make a total of $19,440,000 paid by this company since its first disbursement on July 20, 1906.

The record of the Nipissing, both in the value of production and in the amount of dividends disbursed is considerably better than any other precious metal mining company in Canada. The company has produced upwards of fifty million ounces of silver during the past thirteen years.

The report issued early in the year showed a very satisfactory ore reserve developed in advance of production, estimated to contain about six million ounces of silver. The company has considerable territory which has as yet not been explored. Also, the financial position of the company is strong, the financial statement issued last week showing a balance of $3,863,-386.50.

According to reliable information about 900 tons of ore is being treated daily at the Dome Mines. Mill heads are stated to have recently shown an average of about $9.80 a ton. Allowing for the usual small loss in recovery, it is evident that output has recently averaged about $8,400 daily or at the rate of about $250,000 a month.

In its best days, in 1916, the Dome treated ore at the rate of around 1,300 tons daily, but the average grade was around $5 to the ton. As a consequence of which for the year ended March 31, 1917, an output of $2,171,-784 was recorded. Thus, although present tonnage is not equal to that of 1916-17, the higher grade ore being treated serves to make the current rate of output the highest in the company's history. Were the Dome to be able to maintain an average output of a quarter of a million dollars monthly, or an annual production of around three million dollars, it can readily be seen that net profits would soar to new high levels.

Through fear of misleading the public the directorate of the Dome hesitates to present an official monthly statement, in that conditions over which there might be no control might arise, and, further, that in view of ore reserves being estimated to contain around $5.10 a ton, it could hardly be expected that mill heads will be held at the present high average and a favorable statement for a brief period might be found to be unreliable when calculating the value of shares as regards holding them over a long period. But the outlook is exceedingly favorable.

Developments at depth on the Dome Extension mine being conducted by the Dome Mines through the workings of the latter, and facilitated by reason of the great mining equipment and managerial organization of the Dome Company, is taking on proportions that leads to

the belief that the Dome Extension will on or before March next actually become a part of the Dome Mines itself.

Interests in the north who are watching the developments point to the nature of work on the Dome Extension as reasonable assurance that the Dome Mines Company already anticipate actually taking over the Dome Extension, in that the work being done is not only exploratory, but is preparatory to actual production. The terms which the Dome Company holds its option on Dome Extension is on a basis of thirty shares of Dome Extension for one share of Dome Mines. Here arises an interesting situation. For instance, the quotations for shares of the Dome Mines have recently ranged from $14 to $15 a share, while shares of the Dome Extension have ranged from 30 to 35 cents a share. In buying shares in the Dome Extension at 30 cents a share it is equivalent to buying shares in the Dome Mines at $9 a share or upwards of $5 of a saving—in reality, profit. In buying Dome Extension shares at even 35 cents a share is equivalent to buying shares in the Dome Mines at $10.50, provided, of course, that the option is exercised.

It is an interesting fact that the leading men of the Dome Mines Company already control the Dome Extension stock, which fact would appear to be reasonable assurance that the outlook is such as would indicate a successful consummation of the deal along the proposed lines. The situation appears to offer food for thought among those who speculate.

The question being asked is this: Is there actually a way in which Dome shares may be bought for $10.50 a share.

Mr. John A. Brownlee, who is interested in the development of the Lucky Cross property at Swastika, says:—

"The Marigold Mining Company, Limited bought the property of the Lucky Cross Bondholders Limited tnd started pumping out the workings the latter part of June, working two shifts, the operation took three weeks.

"When the 100 foot level was reached some assaying done returned high values in gold. The Company then decided to install a complete assaying plant which consisted of gasoline engine, crusher, pulverizer and complete equipment for all work necessary.

"Channel sampling was begun and extended from the surface to the 200 foot level and then to the face of the drift. Five foot sections were takn and careful checking of the assays gave returns of $17.20 per ton gold with an average width of 44 inches. Right at the 200 foot level there is five feet two inches of ore that averages $107.60 per ton.

"In the raise from the 200 and about 40 feet above that level 10 feet 5 inches of ore averages $15.60 for the entire width.

"Vein Number 4 on which there has been some surface work done averages $34.40 for two and a half feet."

L. P. Burns, Limited, announce the incorporation of a company under this name, which was formerly Burns & Roberts, Limited, of Toronto. The new company is still at the same address, 301 Bank of Hamilton Building, Toronto. They are manufacturers of tanks, boilers, smoke stacks, plate work, and specialize in new and used machinery of all kinds.

BRITISH COLUMBIA.

THE METAL MINES.

Victoria, B.C.

It appears to be likely that there will be considerable mining development in the Mount Sicker region, Vancouver Island. Following the recent announcement that New York interests had bonded the old copper holdings of the Tyee Copper Company, comes word that the Guggenheimers have acquired the Mount Brenton claims, which are located in the same district. It is stated that development work will be expedited and that if the expectations of the engineers who have reported upon the property are realized, mining will be carried on actively, a concentrator being installed and other necessary equipment provided.

Some months ago the Canadian newspapers carried a statement purporting to come from the Advisory Council for Scientific and Industrial Research to the effect that the prospects of an iron and steel industry being established on the Pacific Coast was extremely remote. Hon. Wm. Sloan, Minister of Mines, immediately took the matter up with Prof. A. B. McCallum, Administrative Chairman of the Research Board, who recently visited British Columbia. He called upon Mr. Sloan and assured him that when the full details of the Board's report are made public it will be found that nothing is said prejudicial to the future of the iron and steel industry in the Pacific Northwest.

The Sechart Mercury Mine, Vancouver Island, which has been idle for some time, has been purchased by Capt. E. H. Mansfield, who proposed to install a distillation plant to produce mercury on the ground. The property is well located for transportation, being situated on an island in Barclay Sound. The mercury content is about 2.5 per cent. If this mine becomes a producer it will be the second in British Columbia to produce quicksilver.

Merritt, B.C.

There have been a number of prominent mining men visiting the Merritt district during the past few weeks. Among them are Joseph Errington, M.E., of San Francisco; A. Leopold and Mr. Mills, of New York; C. G. Davis, representing English interests, and R. S. Lennie, K.C., of Vancouver, accompanied by N. W. Sweetser, M.E., Frank M. Hawkes, secretary of the Donohoe Mine Corporation, and J. F. Knapp, M.E., of Seattle. Messrs. Errington, Leopold and Mills are inspecting the Aspin Grove property. Messrs. Davis, Lennie and Sweeter have been going over the Aberdeen mine, which has been unwatered for their inspection. Messrs. Hawkes and Knapp are interested in the Donohoe Mine Corporation, and J. F. Knapp, M.E., of these properties will be actively developed. The Aspen Grove Amalgamated Mines, Limited, already have been diamond drilled and a considerable quantity of low-grade ore has been blocked out at the Aberdeen. R. R. Hedley, M.E., is prosecuting development work at the Mary Reynolds mine in the Stump Lake district. The new wagon road giving this and other properties transportation facilities, has been completed so that work may now proceed with an assurance that adequate supplies may readily be secured.

Alice Arm, B.C.

With the practical completion of the railway from Tidewater at Alice Arm to the Dolly Varden mine, the operators of other mines in the district are giving evidence of some concern as to the policy of the Taylor Engineering Company towards the handling on the railroad of ore from properties other than the Dolly Varden. The Alice Arm Commercial Club has taken the matter up with the Minister of Mines and the Minister of Railways. It is stated that the company is adverse to committing itself on this point and that as a result work on a number of properties at the head of Kitsault River is being delayed. Mr. Taylor, however, the manager of the Taylor Engineering Company, has given his assurance that everything will be done in his power to assist in the development of the mineral resources of the district.

Creston, B.C.

What is known as the British Columbia Iron Company, Limited, has been formed to develop forty claims situated about three miles west of Kitchener, B.C., and extending in a belt north and south which crosses the C.P.R. line at Thompson Creek. It is stated that this is one of the largest deposits of hematite in the province. Considerable work was done last Fall in opening it up and the management assert that a large body of hematite running from sixty to seventy-five per cent iron has been uncovered. E. C. Wragge, of Nelson, who is interested in the proposition, states that what has been discovered so far is very satisfactory. There are, however, some points to be determined before it can be asserted that this is a commercial proposition. It will take diamond drilling to obtain the knowledge required and the question of taking this step is now being discussed.

Nelson, B.C.

A school for prospectors is likely to be opened this winter in Nelson, B.C. The proposal is favored by the school board of that city and if an instructor can be obtained with the necessary qualifications action will be taken. It is felt that laboratory training and lectures to prospectors would be of material value to the prospectors of the adjacent district and of ultimate benefit to the mining industry.

Construction of a small concentrator on the Emerald Silver-Lead Mine property, Sheep Creek district, is making good progress according to R. W. Mifflin, the superintendent. The work is expected to be complete by the end of November. The plant, which, by running two shifts a day, will have a daily capacity of 30 tons, is designed primarily to demonstrate the feasibility of treating the ore of the Emerald Mine in which lead predominates, by this method.

The plant of the French Complex Ore Reduction Company has been closed down. This enterprise has been supported by the Provincial Government to the extent of about $65,000, which purpose was to demonstrate the practicability of treating with commercial success the fractious silver-lead-zinc ores of the Kootenays by means of the French electroyitical process. A company was formed consisting mainly of Victoria and Nelson men, by whom the patents are held. In addition to the experimental plant at Nelson, one was installed at the Standard Mine at Silverton. The Canadian Consolidated Mining and Smelting Company took an option on the process but did not close on it, having developed in its own plant an electro-chemical process which met its requirements. While the Nelson plant has gone out of operation and the loans made by the Government thus will have to be written off. It is claimed by Mr. French that the Company's experimental work is responsible for the ultimate success attending the development of the electro-chemical processes in the handling of complex zinc ore.

Trial, B.C.

The Consolidated Mining & Smelting Company has offered a scholarship to the student who is the son of any of its employees making the highest marks in the 1919 matriculation examination. The award consists of an allowance of $500.00 a year toward an applied science course, the same to be taken at the British Columbia University or any other Canadian university. S. G. Blaylock, general manager of the company, now is applying for applications for this scholarship. He explains that these applications must be accompanied by a statement of the marks obtained, the name of the father of the applicant and the position the latter holds in the company.

Ore receipts in gross tons for the week from August 14 to August 21, inclusive, at the Canadian Consolidated Company's smelter at Trail, totalled 5,492 tons. This makes an aggregate for the year of 222,987 tons. The heaviest shipper for the week was the Centre Star Mine of Roseland with 2,151 tons, while next in order is the Sullivan Mine of Kimberley.

Kaslo, B.C.

A new road has been constructed to the California Mine, and what is known as the Athabasca mill, is expected to be in operation on ore from this mine within the next two months.

Grand Forks, B.C.

The possibility of the Granby Consolidated Mining and Smelting Company resuming operations at Grand Forks is the subject of considerable speculation. The smelter at Grand Forks was closed down in June, the reason given being lack of coke, occasioned by labor trouble in the Crows Nest Pass district. At the time of the cessation of operations the price of copper was so low that the prospects were not particularly encouraging. Since the close-down Granby officials at Phoenix and Grand Forks are said to have been working on several schemes for the handling of at least fifty thousand tons of good grade ore from the Phoenix property. Shipment to Trail smelters or to Anyox and the installation of a concentrator at the mine, are plans reported to have been considered. There is no doubt, however, that there is the quantity of ore mentioned available and that the company is desirous of treating it before withdrawing entirely from the camp. Having this in mind, and the fact that the coal mines of the Crows Nest are now in operation, which assures a supply of coke, those interested in the district are hopeful that the smelter will be reopened. And meanwhile the citizens of Greenwood are said to have opened negotiations, having in view the acquirement of the Granby Company's ore at Phoenix. This, presumably, would be used by the Greenwood people in their operations of the Canada Copper Company's smelter, providing the same is secured by them in the negotiations now under way.

Greenwood, B.C.

Negotiations between the committee of the citizens of Greenwood and the Canada Copper Corporation, whereby the former propose to take over the Company's properties at Phoenix and the smelter at Greenwood, are said to be practically completed, requiring only ratification by the directors of the company to be effected. Those interested in the transaction are hoping that it may be possible to have the smelter blown in before the end of the year.

THE COLLIERIES.

British Columbia Coal Output in July.

The output of the coal mines of British Columbia for the month of July totalled 143,341 tons, which was made up as follows:

	Tons.
Corbin Coal and Coke Co.	221
Middlesboro Coal Mines, Ltd.	7,216
Fleming Coal Co.	3,477
Coalmont Coal Company	1,800
Princeton Coal Mines, Ltd.	1,104
Canadian Western Fuel Co., Nanaimo	43,612
Canadian Collieries (D), Ltd., Comox	41,782
" " " " Extension	17,714
" " " " S. Wellington	6,966
Pacific Coast Coal Mines, S. Wellington	4,208
B. C. Coal Mines, E. Wellington	3,851
Nanoose Collieries	1,915
Granby Collieries, Ltd., Cassidy's	7,475
Total	143,341

Alberta Collieries Resume Normal Operation.

Conditions are gradually resuming the normal in District 18, U.M.W. of A., which comprises Eastern British Columbia and the Province of Alberta, and according to reports received by the Minister of Labor up to the 25th of August, thirty-one of the leading coal mines of the district are again being worked. This represents sixty percent of the total output. While some opposition still is being experienced by the officials of the United Mine Workers from advocates of the One Big Union Idea, the resistance of the latter appears to be declining.

The books, papers and monies, property of the International Mine Workers of America, District 18, which were in the custody of Edward Brown, secretary of the International of Calgary, who later transferred his allegiance to the O.B.U., have been handed over to International officers. The latter have left to attend the convention to be held at Cleveland, Ohio, at which it is expected there will be some representation of District 18, if the same can be arranged.

The Coal Commissioner, W. H. Armstrong, in a recent statement said that the O.B.U., as far as District 18 is concerned is non-existent. He asserts that the miners who forsook the International Union are seeking reinstatement and that their applications are being granted in the majority of cases. He said that the men are going back on exactly the same terms as they were working before but that when they were in a position to sign a contract it was likely that a new agreement would be entered into between them and the miner owners. During the strike between 8,000 and 9,000 men were idle, and the wives and families of the miners suffered to a considerable extent. The mines, however, were not materially affected, and while it might be a few weeks before full shifts could be taken back, they all would be working in the near future.

Coal Shortage Next Winter Not Anticipated.

Commissioner Armstrong predicted that there would be no shortage of coal this winter because, although the mines were idle for several months, the capacity production is greater than the demand during the autumn months and by working to capacity the reserve stocks for winter can be restored.

An advance of fifty cents a ton on Western Canadian coal is prophesied by D. H. Connor, assistant to the Fuel Controller of Canada, who has returned after an inspection of the Alberta mines. He states that an adequate supply of cars will be available for the transport of coal during the winter months.

Notwithstanding that it has been said by operators and others that no shortage need be feared in the Canadian West, the Canadian Commission of Conservation, is surveying the situation throughout the Dominion, asserts that it is almost a certainty that the supply will be inadequate. Up to June 7 of the present year the total production of anthracite was only 33,349,500 net tons, as compared with 42,858,000 tons in the corresponding period of 1918, a decrease of 9,500,000 tons, or 22 per cent. It is assumed that the 1919 production will be less than 80,000,000 tons, whereas the production last year was 99.514,334 tons. Thus a shortage of 20,000,000 tons, or 20 per cent, is anticipated.

DISCOVERY OF COLD WATER THAWING PROCESS IN YUKON GOLD AREAS.

The work of dredging the famous Bonanza and Eldorado creeks, a total length of forty miles, has been completed and the dredges which did the work and which belong to the Guggenheim or Yukon Gold fleet, have been dismantled and hauled to Dawson. On August 25th, the first of the two left Dawson by steamer for Seattle via St. Michael, her final destination being unknown. It is reported the Guggenheim may send them to Burma, India or the Malay Peninsula to dig tin. Dredges owned by the same Company are operating on Hunker, Gold Run and Bear creeks, and one at Guggieville on the Klondike River.

With several years life ahead of this field and prospects that a new discovery in cold water thawing will reduce the cost of thawing one-half, many more miles of low-grade properties in this country will be brought into profitable operating range. It is known that one hundred miles of dredging ground remain to be worked in the vicinity of Dawson.

It is claimed that every camp in the frozen ground of Alaska and the Yukon will benefit by the cold water system which will give increased acreage and prolonged life. The Yukon Gold Company of Dawson, up to August 27th, have turned over yardage which exceeds several times that removed at the Panama Canal.

Many hydraulic plants are still working gold on the high benches of Bonanza and Klondike river and also on the numerous Hunker hills. The Canadian Klondike Company are operating steadily three large dredges on the Upper Yukon Valley. The gold yield to date is $200,000,000. It is estimated that fully that much more will be received before the camp placers are exhausted.

For those who are not familiar with the cold water thawing, this is practically the same as steam, using points or even pipe with hose attached through the water is forced at a pressure into the ground. As long as the pressure is kept up there is no danger of freezing. A ten foot pipe will force its way into the ground and the earth about for three or four feet will be loosened up and thawed out in about an hour's time with a pressure of from forty to sixty pounds.

DISCOVERY OF FREE MILLING GOLD AT DRUM LUMMON.

Prof. Edwin T. Hodge, of the University of B. C. has just completed a report on the Drum Lummon mine near Hartley Bay, Douglas Channel, in which he comments on the discovery of free milling gold in the workings of this mine.

Prof. Hodge declares that there is a wonderful showing on this property, not only of high-grade copper and gold, but of other minerals, the formations being of a rare nature, almost suggestive of gems.

In his report, Prof. Hodge, says: "This property is usually looked upon as a copper mine, but I am of the opinion that gold values may be the determining fact or in making it a productive mine. Every sample that I have taken shows a trace of gold. The gold occurs as irregular shaped nuggets, as sheets and as tiny flakes, but in close association with shalcocite and bornite.

"Gold values are constant in all the ore. Small gold shoots have been found and I anticipate the finding of larger gold shoots, some, perhaps, of bonanza type. The finding of a few large shoots of rich ore is one of the possibilities in this property—a possibility which makes it worthy of further development."

Mr. Porteaus Sloan, managing director of the company, who arrived in Vancouver from the mine the first week in August says that the work of driving the west drift, in which high-grade copper was encountered last year a further distance of 2000 ft. will be undertaken at once. This was suggested by Prof. Hodge after examining the mine and the geology of the locality.

The high values in the mine are being maintained as the drill is advanced, declares Mr. Sloan. A large amount of ore has already been blocked out and exploration work will be carried on through the winter. Shipments of concentrates are being made to the smelters at Tacoma, the mill recently installed concentrating the general run of the mine.

COAL-MINING IN SPITSBERGEN.

Coal was first discovered in Spitsbergen in 1900, when a Norwegian ship exported the first cargo. The Gulf Stream affects the climate on the west coast of the island, where the principal settlements are found, most of the claims being taken up by Norwegian, English, Swedish, and Russian companies.

The Norwegian Spitsbergen Company, which is the principal concern, has acquired one English, one American and one Norwegian company, and in two years exported 85,000 tons of coal. Six other Norwegian companies have started work during the last few years.

The coal, according to the **Teknisk Ukeblad,** is of superior quality, containing very little ash, is comparatively free from sulphur and has a high calorific value, varying from 13,000 to 14,500 B.Th.U. per 1 lb. It is excellent steam coal, but does not contain sufficient volatile matter for a gas coal. It does not clinker.

Mining is easy, as the ground is frozen to a great depth and perfectly dry. There is very little dust and no fire-damp. The temperature of the headings seldom rises above 25 deg. F., but the absence of humidity makes the low temperature quite tolerable. The coal is found below a bed of smooth sandstone, which forms an excellent safe roof.

The upper tertiary beds, which contain the best coal, consist of three seams with a combined thickness of 6 ft. They are separated by beds of shale 1 to 2 ft. thick, and nearly horizontal; the dip being only 2-3 deg. Sporadically, the dip increases to 10-12 deg.

The coal in the lowest steam, which is 3 ft. 3 in. thick, is free from shale or other impurities.

RECENT MINING INCORPORATIONS.

Davidson Consolidated Gold Mines, Limited, Incorporators: Joseph Montgomery, barrister-at-law; Daniel Alexander Sherriff and Russel Edwards Evans, accountants; Elsie White, book-keeper; and May Stern, stenographer—all of Toronto. Capital $5,000,000, divided into 5,000,000 shares of $1 each. Head office, Toronto.

Symmes-Young Silver Mines, Limited (no personal liability.) Incorporators: Mervil MacDonald, Geoffrey Walters Adams, and Percy Edwin Smily, barristers-at-law; Robert Roy McKay, student-at-law; and Bertha Rice, stenographer—all of Toronto. Capital $2,000,000, divided into 2,000,000 shares of $1 each. Head office, Toronto.

Nipissing Extension Mines, Limited. Incorporators: John Wellington Pickup, solicitor; Thomas Arthur Dark, actuary; Charles Quincy Parker, company secretary; Harold Aldis Bernard, insurance clerk; and George Barner, accountant—all of Toronto. Capital $3,000,000, divided into 3,000,000 shares of $1 each. Head office, Toronto.

The Brown Feldspar Potash, Limited. Incorporators: Lena Adams, bookkeeper; Henry Cartwright Secord, broker; Kenneth Alexander McRae, engineer; Mary Winnifred Hunt, stenographer; and Mabel Gray, teacher—all of Toronto. Capital $500,000, divided into 500,000 shares of $1 each. Head office, Toronto.

Granby-Kirkland Gold mines, Limited. Incorporators: Newton Carman Shaver, prospector; Verneta Brown Shaver, Claudene Brown Bagshaw, and Dorothy Howard Brown, married women—all of Toronto; and Howard Milton Brown, Chicago, Ill., sales manager. Capital $2,000,000, divided into 2,000,000 shares of $1 each. Head office, Toronto.

Camburn Silver Mines, Limited (no personal liability.) Incorporators: Archibald Woodburn Langmuir, Donald Black Sinclair, and Harold Wilson Shapley, solicitors; George Charles Loveys, accountant; and Jennie Jardine Elliott Hayes, office secretary—all of Toronto. Capital $1,500,000, divided into 1,500,000 shares of $1 each. Head office, Toronto.

Pittsburg and Northern Ontario Exploration and Development Company, Limited. Incorporators: George Arthur Young, broker; James Howard Young, insurance agent; Joseph Edward Hallatt, prospector; Norman Currie Urquhart, accountant; and Eva Leach, stenographer—all of Toronto. Capital $100,000, divided into 10,000 shares of $10 each. Head office, Toronto.

Book Review

MINERAL DEPOSITS. By Waldemar Lindgren, professor of economic geology, Massachusetts Institute of Technology, and formerly geologist U. S. Geological Survey. Published by McGraw-Hill Book Co., New York.

This is the second edition of a splendid book. The author has endeavored to bring the subject up to date, and, owing to his exceptional ability, has been very successful in interpreting the results of recent investigations and in giving them the proper place in the discussions. All of the chapters have been revised and many of them largely rewritten. The result is an up to the minute treatise by a man who has an international reputation as a geologist.

Dr. Lindgren takes up the subject of mineral deposits in a scientific and at the same time simple manner. He makes it plain at the outset that the intelligent study of mineral deposits requires a very good working knowledge of physics and chemistry, as well as keen observation on the part of the student. To such readers the book will seem in part a very elementary treatise; but this very simplicity helps one to follow the application of principles to the particular deposits selected as examples.

In the introductory chapter the author first gives definitions of the terms used in economic geology. He refers briefly to the occurrence of metals in the earth's crust, and to their value.

In a chapter on formation of minerals there is discussed solution and precipitation; influence of pressure and temperature; precipitation by evaporation, by reaction between solutions and solids and between gases or gases and solutions. Crystalline minerals and colloids are described.

Then follow three chapters on underground waterflow, composition and chemical work of. In these three chapters a very good idea of the nature and behavior of the water circulating in the rocks is given. Particularly instructive is the discussion on alteration of rocks by the formation of new minerals which take the place of other minerals which have been removed by the same agency.

The author then discusses the origin of underground waters. He makes it clear that most of the water is of meteoric origin—such water as we have at the surface, but temporarily laden with mineral substances dissolved from the rocks, and thus potential formers of new mineral deposits. Of less volume, but also of great importance, are the magmatic or juvenile waters, such as escape from some springs in volcanic regions.

Spring deposits and the relation of mineral deposits to mineral springs form the subject of two chapters. Interesting and significant are the descriptions of deposits now being formed by hot springs.

Chapter 9 deals with folding and faulting. Faults are classified and several types described.

Openings in rocks, is the subject of the next chapter. Cavities originate in many ways; by original mode of formation, as in the case of amygdaloidal volcanic rocks; by solution as in limestones; by fractures such as contraction joints produced by tensile stress or shrinkage; expansion joints as in serpentines. Fissures are also produced by torsional stress; by folding of sedimentary strata, by shearing stress under action of gravity and by compressive stress.

The next two chapters deal with the form and structure of mineral deposits and their texture. Here comes the natural classification into two groups — those ore deposits which were formed with the rocks that enclose them and those were which formed later than the enclosing rocks. The former are called syngenetic and the latter epigenetic. The author attaches less importance to form than to mineral association in classifying deposits, but he points out that the form, while often largely accidental, is of great importance in mining. He defines veins, lodes, sheeted zones, stockwork, stringer lode, pipe, ladder veins, lenticular veins, bed veins, gash veins and vein systems. Texture of the deposits is considered with reference to the temperature of formation. In veins formed at lower temperatures and comparatively shallow depths crustified and drusy forms and fine granular texture predominate, while in deep seated veins the texture is commonly coarsely crystalline and massive. Crushing and brecciation of the early minerals is extremely common, and repeated opening of the fissure is sometimes indicated by the texture of the deposit.

The occurrence and form of ore-shoots is dealt with in chapter 13. The deposition of valuable minerals from solutions is partly by decrease in pressure and temperature, but there are important accompanying factors such as favorable character of the wall rock. A number of diagrams are used with the text to illustrate various forms of ore-shoots and the influence of rocks and intersections.

The classification of mineral deposits is then taken up. Grouping by substances and uses is briefly referred to. A genetic classification is adopted as most desirable, both theoretically and practically. The author considers that each deposit should be considered as a problem in physical chemistry. In his scheme he makes two major divisions: (1) The deposits such as placers formed by mechanical processes of concentration. (2) The great majority of deposits which have been produced by chemical processes of concentration. Two cases are distinguished; the substances were originally contained in the same geological body in which the deposit is found, or they may have been introduced from the outside. Most metal deposits belong to the latter class. Deposits of this kind occur along fissures or from replacements along fissures or are found in general where opportunity is offered for vigorous circulation of the depositing waters.

The metal deposits genetically connected with igneous rocks are sub-divided into several groups according to the evidence of mineral association and geological relations.

The first group includes ores deposited at slight depth below the surface; the temperature is here relatively low, perhaps from 50 deg. to 150 deg. C. and the pressure will scarcely exceed 100 atmospheres. Examples of this group are found in the gold and silver veins of Tonopah, the Cripple Creek gold telluride veins and the California quicksilver veins.

A second group of deposits was formed by hot ascending waters at moderate depths, say from 5,000 to 10,000 feet below the surface at temperature of perhaps 150 deg. to 250 deg. C and correspondingly increased pressure. Examples of these are the gold-quartz veins of California and the metasomatic pyritic deposits of Leadville.

A third, deep seated group includes veins and contact-metamorphic deposits. The temperature of for-

mation in these cases was high, but in most cases below 575 deg. C, the crystallographic inversion point for quartz. The pressure was probably very high. Some gold quartz veins, including those of the Porcupine and Kirkland Lake districts, Ontario, are placed in this group. Cassiterite veins and tourmaline-copper veins are also in this group.

Another class of deposits includes those formed by concentration in igneous magmas, as in the case of the iron ores of northern Sweden and the nickel-copper ores of the Sudbury district, Ontario.

Following these introductory chapters, which take up 206 pages, comes the description of ore deposits in groups in accordance with the scheme of classification adopted. The chapter headings are:

15. Deposits formed by mechanical processes of transportation and concentration; detrital deposits.
16. Deposits produced by chemical processes of concentration in bodies of surface water by reaction between solutions.
17. Deposits formed by evaporation of bodies of surface waters.
18. Deposits formed from processes of rock decay and weathering.
19. The hematite deposits of the Lake Superior region.
20. Deposits formed by concentration of substances contained in the surrounding rocks, by means of circulating waters.
21. Deposits resulting from regional metamorphism.
22. Deposits of native copper with zeolites in basic lavas.
23. Lead and zinc deposits in sedimentary rocks; origin independent or igneous activity.
24. Deposits formed near the surface by ascending thermal waters and in genetic connection with igneous rocks.
25. Deposits formed at intermediate depths by ascending thermal waters and in genetic connection with intrusive rocks.
26. Veins and replacement deposits formed at high temperatures and pressure and in genetic connection with intrusive rocks.
27. Deposits formed by processes of igneous matamorphism.
28. Deposits of the pegmatite dikes.
29. Deposits formed by concentration in molten magmas.
30. Metamorphiosed deposits.

These chapter headings summarize the author's scheme of classification. In each chapter will be found described a group of deposits. Examples are taken from all parts of the world, but American deposits naturally receive the most attention. Many Canadian mining districts are referred to. In chapter 15 there are many references to the Klondike gold deposits. The Quebec asbestos deposits come in the group treated in chapter 20. In chapter 25 the Nova Scotia and Deloro gold deposits are mentioned, and the Cobalt silver deposits receive special attention. This chapter and the succeeding one, which deals with the group which includes many of the gold deposits of Ontario, are specially well worth reading. What Dr. Lindgren has to say about the gold deposits dealt with in these two chapters should prove useful to anyone interested in the development of gold properties in Canada.

In chapter 27 the Hedley gold deposit at Hedley, B.C., is described as the best known example of the gold-arsenopyrite type formed by ingneous metamorphism. The graphite deposits of Eastern Ontario and Quebec and the copper deposits of the boundary district, B.C., are also described here. The Canadian mica deposits are mentioned in chapter 28, and some of the molybdenite deposits belong to this group. In chapter 29 the Sudbury nickel-copper deposits, the Quebec chromite deposits and the Ontario corundum deposits are mentioned. The Sudbury deposits are described at some length.

Chapter 31 deals with the oxidation of metallic ores by weathering agencies. It is noted that in glaciated areas there has been comparatively little oxidation since the glaciers cleaned away the older accumulations of weathered products. In other areas oxidation may extend to very considerable depth and the proper interpretation of surface outcrops necessitates a good working knowledge of the nature of the alterations that take place as a result of exposure.

In chapter 32 an attempt is made to group ore deposits by reference to the metallogenetic epochs or time intervals favorable for the deposition of certain useful minerals. In treating those of North America the author deals separately with those of the east and of the west. In the east he distinguishes: 1, the Pre-Cambrian epochs; 2, Paleozoic sedimentary epochs; 3, Paleozoic epochs of saline deposits; 4, epochs of Triassic copper deposits; 5, Cretaceous and later periods of lead and zinc concentration; 6, Tertiary and recent products of rock decay.

In the Western or Cordilleran part of the continent Dr. Lindgren distinguishes: 1, The Pre-Cambrian epoch; 2, The Early Mesozoic epoch; 3, The Late Mesozoic epochs; 4, The Early Tertiary epoch; 5, The Late Tertiary epoch; 6, The Post-Pliocene epoch; 7, Cretaceous or later epochs of copper concentration in sedimentary rocks.—R. E. H.

COAL SITUATION AND MINERAL PRODUCTION IN NEW SOUTH WALES.

Sydney, as the chief commercial entrepot of Australia, largely owes its position to the existence of the most valuable coal mines in Australia at its feet. The coal deposits, which are almost inexhaustible, extend 100 miles north, south, and west of Sydney—also under the bed of the Pacific Ocean to an undetermined extent. The coal is of the highest grade and suitable for all purposes, such as gas making, coke making, household or factory purposes, and for bunkering steamers.

Labour troubles in connection with the mining of coal are always existent, and one trouble is no sooner settled than another crops up. Two years ago the price of coal was, at the instance of the Government, put up three shillings per ton, which, of course, meant an increased hewing rate. Labour troubles have again arisen, and the Commonwealth Government has therefore intervened and announced its intention to take over the mines of New South Wales, and a proclamation has been issued to that effect. According to the Canadian Government Trade Commissioner at Sydney, there is much talk about nationalisation," and this action, of course, again resurrects such suppositions; but what the ultimate end will be remains to be seen.

The coal trade of the State has of course been considerably interrupted during the war period, foreign exportation having almost entirely ceased owing to the cost and difficulty of obtaining freightage. Business relations with foreign buyers have, however,

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FIXED DRUMS, keyed fast to shaft. Drums cannot revolve in either direction except driven by the engines or motor. The load is under absolute positive control at all times.

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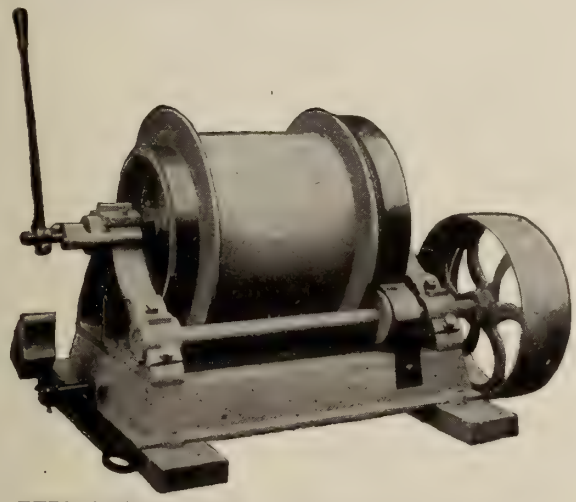

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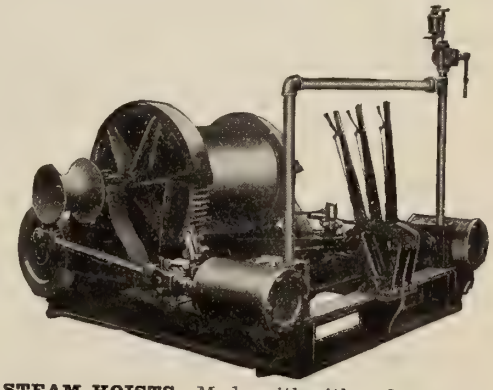

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again been resumed, but labour troubles which are at present looming, appear as if they would cause another interruption to trading relations.

Mineral Output for 1918.

War prices for most metals made the New South Wales mineral output for 1918 a record so far as value is concerned. The production totalled £14,391,981, which was £1,439,262 better than 1917, the State's previous best.

There was also a small recovery in the gold won—87,145 ounces, valued at £369,473, as compared with 82,171 ounces valued at £349,038 in the year 1917. Most of the gold now obtained is extracted from copper ore in its treatment. Of the £696,580 worth of copper produced, £501,685 was obtained from the great Cobar copper mine, which, owing to the reduced price of copper and labour troubles, has been closed down for the present.

Tin gave £548,876 in 1918, compared with £373,696 in 1917.

The output of the silver-lead mines was £5,712,138, being an increase of £600,000 over the previous year.

The aggregate mineral production of the States now totals £300,499,184, of which coal has provided the major part of £92,721,420, silver-lead £86,235,094, gold, £62,368,521, copper £14,988,804, zinc £13,000,000, and tin £11,511,880.

Coke Production.

Upwards of one-half of all the coke produced in the state of New South Wales, the value of which last year was £387,000, is produced in the Illawarra District (40 miles from Sydney), the balance being produced at Newcastle and the western districts. Owing to the closing down of the metalliferous industry in many directions, there has been a large curtailment of smelting operations. Consequently huge stacks of coke have accumulated and most of the works are only running half time. Not long ago the main concern of the managers was the securing of sufficient slack for the purpose, but at present their trouble is to use all the slack available.

BELGIAN COLLIERIES RECOVERING

The total Belgian output of coal during July amounted to very nearly 87 per cent. of the average monthly production during 1913. In the Mons and central districts the coal output in July reached practically the pre-war output. In the Charleroi the output amounted to 85 per cent. and in the Liege district 77 per cent.

PERSONALS.

Mr. P. E. Hopkins of the Ontario Bureau of Mines has gone to the Wasapika gold area, where he will spend the balance of the field season in geological mapping of the area.

Mr. A. G. Burrows of the Ontario Bureau of Mines is now at Metachewan, revisiting the gold properties there. He will be at Matachewan a short time and will then go to Gowganda.

Mr. M. Y. Williams of the Geological Survey, Ottawa, who is an authority on the geology of oil areas, and Mr. Jos. Keele of the Mines Branch, Ottawa, who specializes in clays, are making examinations along the proposed T. & N. O. railway extension north of Cochrane.

The Canadian Miners' Buying Directory.

Acetylene Gas:
Canada Carbide Company, Ltd.
Canadian Fairbanks-Morse.

A.C. Units:
MacGovern & Co.

Agitators:
The Dorr Co.

Air Hoists:
Canadian Ingersoll-Rand Co., Ltd.
Mussens, Limited.

Alternators:
MacGovern & Co.

Amalgamators:
Northern Canada Supply Co.
Mine and Smelter Supply Co.
Wabi Iron Works.

Antimony:
Canada Metal Co.

Antimonial Lead:
Pennsylvania Smelting Co.

Arrester, Locomotive Spark:
Hendrick Manufacturing Co.

Arsenic White Lead:
Coniagas Reduction Co.

Assayers' and Chemists' Supplies:
Dominion Engineering & Inspection Co.
Lymans, Limited
Mine & Smelter Supply Co.
Pennsylvania Smelting Co.
Stanley, W. F. & Co., Ltd.

Assayers and Chemists:
Milton L. Hersey Co., Ltd.
Campbell & Deyell
Ledoux & Co.
Thos. Heys & Son.
C. L. Constant Co.

Asbestos:
Everitt & Co.

Balls:
Canadian Foundries and Forgings, Ltd.
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works.
The Hardinge Conical Mill Co.

Ball Mills:
Hardinge Conical Mill Co.
Mine and Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works.

Balances—Heusser:
Canadian Fairbanks-Morse Co., Ltd.
Mine and Smelter Supply Co.

Babbit Metals:
Canada Metal Co.
Canadian Fairbanks-Morse Co., Ltd.
Hoyt Metal Co.

Ball Mill Feeders:
Hardinge Conical Mill Co.

Ball Mill Linings:
Hardinge Conical Mill Co.

Belting—Leather, Rubber and Cotton:
Canadian Fairbanks-Morse Co., Ltd.
Link Belt Co.
The Mine & Smelter Supply Co.
Northern Canada Supply Co.
Jones & Glasco.

Belting:
R. T. Gilman & Co.

Belting (Transmission):
Goodyear Tire & Rubber Co.

Belting (Elevator):
Goodyear Tire & Rubber Co.

Belting (Conveyor):
Goodyear Tire & Rubber Co.

Blasting Batteries and Supplies:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Ltd.
Northern Canada Supply Co.
Canadian Explosives, Ltd.

Bluestone:
The Consolidated Mining & Smelting Co.

Blowers:
Canadian Fairbanks-Morse Co., Ltd.
MacGovern & Co., Inc.
Northern Canada Supply Co.
Fraser & Chalmers of Canada, Ltd.

Boilers:
Northern Canada Supply Co.
Canadian Ingersoll-Rand Co., Ltd.
Marsh Engineering Works
MacGovern & Co., Inc.
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
The John Inglis Company
Wabi Iron Works.

Blue Vitriol (Coniagas Red):
Canadian Fairbanks-Morse Co., Ltd.

Bortz and Carbons:
Diamond Drill Carbon Co.

Boxes, Cable Junction:
Standard Underground Cable Co. of Canada, Ltd.
Northern Electric Co., Ltd.

Brazilian Rough Diamonds:
Diamond Drill Carbon Co.

Brazilian Mica:
Diamond Drill Carbon Co.

Buggies, Mine Car (Steel)
Hendrick Manufacturing Co.

Brazilian Ballas:
Diamond Drill Carbon Co.

Brazilian Rock Crystal:
Diamond Drill Carbon Co.

Brazilian Tourmalines:
Diamond Drill Carbon Co.

Brazilian Aquamarines:
Diamond Drill Carbon Co.

Bronze, Manganese, Perforated and Plain:
Hendrick Manufacturing Co.

Buckets:
Canadian Ingersoll-Rand Co., Ltd.
The Electric Steel & Metals Co.
R. T. Gilman & Co.
Hendrick Manufacturing Co.
Link-Belt Co.
M. Beatty & Sons, Ltd.
Marsh Engineering Works
Mussens, Ltd.
Northern Canada Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

Buckets, Elevator:
Hendrick Mfg. Co.

Cable—Aerial and Underground:
Northern Canada Supply Co.
Standard Underground Cable Co. of Canada, Ltd.

Cableways:
M. Beatty & Sons, Ltd.
Fraser & Chalmers of Canada, Ltd.
Mussens, Ltd.
The Wabi Iron Works
R. T. Gilman & Co.

Cages:
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Northern Canada Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
Mussens, Ltd.
The Wabi Iron Works

:-: EDITORIAL :-:

NANAIMO MINE-RESCUE AND FIRST AID MEET.

We are pleased to receive from the Journal's British Columbia correspondent an account of the first international mine-rescue and first-aid competition ever held in the Pacific North-West, which was a feature of the Labour Day Meet of the Vancouver Island Mine Safety Association at Nanaimo.

Nowhere is international co-operation and good fellowship more appropriately shown than in humanitarian endeavour and in the amelioration of industrial hazards.

The "Journal" is glad to second the suggestion that Vancouver Island teams should be sent to take part in the Pittsburgh Safety Meet. Mr. Sloan, the Minister of Mines of British Columbia, is apparently a Minister who is vitally interested in the Department under his charge, and in attending the Vancouver Island Safety Meet he has displayed a proper conception of his duties of his office. Even emulation in good works is apt to pall if official approval is not prominently displayed, and writing from a distance, the "Journal" desires to congratulate most heartily all those who helped to organize the competition and to defray the expenses connected with it. It is time and money excellently well spent.

The keenness of the tests on which the marks were accredited to the competing teams is also a welcome evidence of a realization on the part of the organizers of mine rescue teams equipped with breathing apparatus that rescue work should not be attempted without rigorous tests of the tightness and general safety of breathing apparatus. A defective apparatus spells only an additional casualty.

THE PORT COLBORNE ELEVATOR EXPLOSION.

The dust explosion at the Port Colborne elevator is a reminder that dust detonation is a danger not confined to coal mines, but that it is present wherever combustible matter is disseminated and suspended in the atmosphere as impalpable dust. Flour mills, grain elevators, mine screening-plants are not distinguishable from coal-mines in this regard, except in so far as the passages and workings of a dusty mine contain a percentage of inflammable gases. The dissemination of carbonaceous material through the atmosphere causes that intimate admixture with the oxygen of the air which gives every dust particle the potentialities of rapid combustion accompanied by rapid expansion of liberated gases that constitute a truly explosive mixture. One of the singular features of coal mines regulation has been the disinclination of mining men to believe in the explosive properties of floating coal-dust, and there are those even yet who are not fully convinced judging by the risks they take in lightly regarding the presence of coal-dust as a source of danger. The persistence of coal-miners in continuing to use black powder, with primitive methods of detonation, naked lights, bare electric wiring, and unenclosed electric motors in the presence of coal-dust, usually associated with a little gas and modern methods of copious and swiftly moving ventilation currents, is an anachronism that would be speedily corrected if coal-miners really believed that coal-dust will detonate.

Accumulations of inflammable gas are usually regarded as the predisposing cause of most disastrous coal mine explosions, but a little analysis of the circumstances accompanying colliery explosions will reveal that a significantly large proportion of them were brought about by improper methods of blasting the coal in the presence of coal-dust, and probably only a trifling percentage of gas.

Dusty roads, black powder, "squib" detonation, naked lights; these are the forerunners of the coroner's inquest on coal miners.

CALCULATIONS ON THE COST OF LIVING.

The tabulation contained in the monthly issue of the "Labour Gazette" showing the cost of food-stuffs, coal, rent and light, averaged over the representative population centres of Canada, has been a source of authoritative reference much used in the past five years, and those who have had occasion to follow the flight of living costs into the empyrean can bear testimony to the general accuracy of these figures. Their usefulness has however, been limited by the absence of comparative figures on the costs of boots and clothing, items of the weekly budget that are becoming of ever-increasing importance, not to say concern.

Calculations of the cost of living are invidious ones to make, and their accuracy can be impugned on a thousand categories, according as one is buying or selling labour. The percentage of living expenses borne by the individual items that compose them will vary according to social status, occupational requirements, and individual preferences. The bulking of the item of food-stuffs becomes larger and more menacing as the "margin of subsistence" is approached, but while in the case of the man with small wages and a large family in the dependent stage, the increase of the cost of food-stuffs by one hundred per cent may necessitate an increase of his wages by almost the same amount unless his relative financial position is to be impaired, this

becomes less the case as the expenditures outside of food-stuffs increase.

For this reason, among many others, the usefulness of cost of living statistics is nullified unless it includes all the necessary items of life, among which boots and clothing must be numbered.

If it should be that the index number is about to descend from its celestial expedition, the necessity for some unbiased and authoritative reference will become even more apparent.

It has recently been stated by Prof. Nicholson, a student of economics, that the real workingman stands to gain much more by the decline of prices than by further increases in wages, but the divergment of opinion on this question, if prices ever do come down, will be just as wide as the gulf between Dives and Lazarus.

We would suggest for the consideration of the Department of Labour that it should attempt to increase the statistical value of the "Family Budget" tabulation by including the items of boots and clothing. The difficulties of doing this are great, admittedly great, but it seems quite necessary that the calculation should be a complete one.

In this connection it is interesting to note that the "Labor Gazette" for August contains a complete and detailed calculation of the average family budget for the periods 1908-10, 1913 and 1918, which include clothing item by item. This is a commendable innovation, and having gone so far, it should be less difficult to enlarge the scope of the familiar calculation of the "Weekly Budget."

It has been suggested by persons who had private axes to grind that the cost of living calculations of the Department of Labour were "faked," the reason given being partly political, and partly based on local price vagaries, but those who make such a statement betray their ignorance of the intricacy of the calculation, the interesting affect of the "mass average" in eliminating local error, and the practical impossibility of "faking" statistics of this kind. It is said that a liar must have a good memory, but the cost of living statistician who attempted to arrange his figures so as to achieve certain ends, regardless of the accuracy of such figures, would require to have not only a phenomenal memory, but would have to be the champion of liars.

We must realize that the wastes of war can only be made good by hard work and not by soft money.

With the abandonment of soft money the soft ways of making money must also be abandoned.

We must try to get back to the pre-war methods of larger production with narrower margins for profit. It is hopeless to tell labor to work more and produce more if there is to be artificial scarcity to secure higher prices.

If capital still tries to continue on the methods of scarcity and monopoly and high prices — I do not say all capital, but enough to be noticeable — there is a real danger of social insecurity.

Capital is asking in some quarters for governmental insurance against falling prices. I venture to say that falling prices are a necessary insurance for the security of capital in general.

A continuance of the raise in prices is not only dangerous to capital, because it may bring social revolution into the range of practical politics, but it is dangerous in a more particular way — the way namely of **foreign trade.**

The real working classes stand to benefit more by falling prices than by rising money wages.

Extracts from a letter given to the staff of Barclay's Bank, London, by Prof. J. S. Nicholson.

CONSOLIDATION OF CORUNDUM MANUFACTURERS.

The International Abrasive Corporation is making application for listing on the Boston Stock Exchange.

This consolidation is of interest to Canadian readers as it is comprised of the Superior Corundum Wheel Company, Dominion Abrasive Wheel Company, Harrison Supply Company, and National Abrasive Company with plant at Waltham, Mass., Amesbury, Mass., Niagara Falls, Ont., and Mimico, Ont. Three of these companies are successfully established. The National Abrasive Company is a new producer.

It is stated that the new Company will be the only producer of "Natite," said to be the most successful of manufactured corundums, and it is claimed that a ton of this patented product can be produced for $14.25 against $30 per ton of corundum by the ordinary bauxite process.

The situation of the plants of the Company in both Canada and the United States is expected to give maximum tariff advantages.

BRITTANIA MINING CO., HOWE SOUND, SHOWING RECORD PRODUCTION.

The mine and plant of the Britannia Mining Company, Howe Sound, are working to capacity, and the production records are the highest in the history of the company. The mill is treating about 2,500 tons a day and producing about 2,000,000 pounds of copper per month. The Brittania mine has now four levels extended through Britannia Mountain, connecting with the Empress group. During the past year new developments aggregated 24,595 feet. Diamond drilling was done to the extent of 26,682 feet. Raises are now being driven to connect the 2,700 feet level with the 4,100 or mill level, so that ore can be delivered by gravity to the ore cars on the mill level. This permits the underground transportation of all ore and overcomes winter interruptions to transportation.

Larder Lake District, Northern Ontario

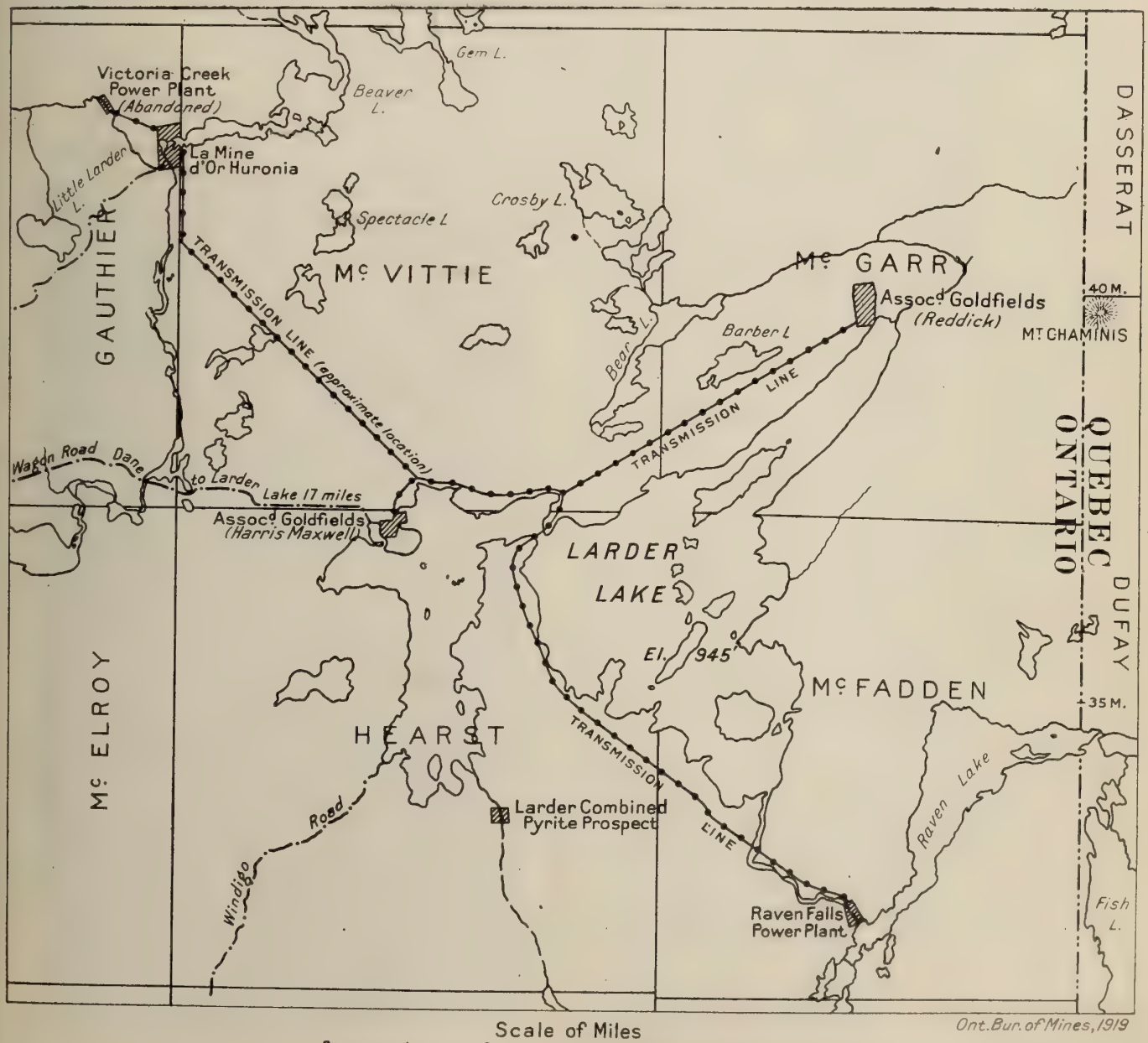
By N. C. PEARCE.

Going forward at Larder Lake is one of the really interesting mining enterprises of Northern Ontario. The program, now being worked out on the properties, calls for the development, the mining, and the milling of huge tonnages of low grade ore. The ore is of a character that has given rise to many opinions of its worth. The mining according to program, will be of the open-cut sort on ore bodies, 300 feet and more in width. The milling, if it is to have a success in keeping with the remainder of the ambitious plan, will be done in mills of capacity greater than anything in Northern Ontario, greater even than the units now being completed at the Hollinger, with their total of 3,500 tons daily. In fact, two mills, each of 5,000 tons, are talked of.

The company which has all these broad guage plans in hand, is the Associated Goldfields Mining Company. In the early stages before production. monetary strength of a company reflects confidence, and this company has $550,000 of confidence, cashed, in the banks. With that much to go on their enterprise can be discussed with a feeling that it will be carried well forward and that we shall see a good trial of the worth of the big low grade ore bodies which are being developed.

The results are bound to be of extreme interest all through Northern Ontario for other bodies, more or less similar in character although not in size, exist in other parts. Some of these, as the writer knows were staked first a dozen years ago, allowed to lapse, and restaked since, and perhaps some are again even.

The properties being worked by the Associated Goldfields—their total holdings in Larder Lake being 2000 acres—are the Harris-Maxwell, Reddick and Kerr-



The Larder Lake Area.

Addison. These names, particularly the first two, are well known to those who remember the boom in Larder that followed the early exciting years of Cobalt.

At the Harris-Maxwell the ore body on surface was opened up across a width of 130 feet. It may be wider there for water on one side and deep overburden on the other cut off further investigation. At the 500 feet level cross cuts of more than 300 feet have failed to find either wall. This body is known to be 1000 feet long.

The Kerr-Addison and Reddick properties, which adjoin, our ore body that at surface outcrops 300 feet in width, and is indicated by diamond drill to be 500 feet wide in places. This can be traced on surface over a length of 1200 feet, and a recent strike in the underground work on the Reddick would indicate that its length is at least 2000 feet. These figures tell of the enormous prospects providing the ore bodies are found to contain commercial ore throughout their length and breadth.

In general, the geology of Larder Lake is similar to the pre-Cambrian in many other parts of the north country. The oldest rocks are dominantly volcanics, comprising green stones and green schists. Associated with them are bands of ferruginous carbonate, iron formation, slate and conglomerate, which strike nearly east and west and dip vertically.

The rusty-weathering carbonate rocks at Larder are inter-sected by quart and calcite stringers. This type of material can be found in or near many of the gold areas of Northern Ontario, but at Larder it is found to carry considerably more gold than is usually contained. The carbonates are, on the Associated Goldfields properties, dolomites, occurring in bands of the widths mentioned. Usually brown in color, often large parts of them have been altered to green fuchsite or mariposite, serpentine and talc. A complicated network of quartz stringers is the gold carrier. In places the gold is quite coarse, but it is usually so finely disseminated as to be discoverable only by assay.

The point many examiners of these dolomite bands have labored to prove is that very careful sampling, in fine detail, will have to be done to determine which of these quartz stringers (sometimes four feet wide) or ore shoots (where they are thickly matted) are worth treatment. What the Associated engineers believe is that the quartz is sufficiently wealthy to make mining and milling of the whole material a profitable undertaking. Sampling to date has not caused the engineers to swerve from this idea, and now further sampling over entire widths is being done. In the final analysis, an extensive mill run can be the only decisive test.

The Harris-Maxwell property consists of two claims on the northwest shore of Larder Lake. Here the main camps and offices of the company are located. Communication with the other working properties, which are nine miles down the lake to the east, is made in summer by launch and in winter over the ice. At present the men are housed in bits of cabins, and they eat in a large marquee. Sleeping and cook camps for a staff of 200 are under erection and should be completed by the end of September. Living conditions then will be much improved and it will be possible to attract a full working crew. As it is now, the company employs far more men than any other developing mine in Northern Ontario.

The workings at the Harris-Maxwell are confined to crosscutting and drifting at the 500 foot level, where in all about 1200 feet of work has been done. Stations were cut in the shaft at each 100 feet. The openings are all in silicified dolomite. To a depth of 440 feet the workings are largely in grey dolomite while below this the rock is quite green, being rich in fuchsite, and cut by quartz stringers which carry much tourmaline and pyrite. Quite coarse gold can be seen in several places, and it is often accompanied by the fine galena.

At the 500 foot level considerable faulting is to be observed, also a change in places back to grey dolomite from the green. The management make the statement that the ore body should produce millheads of at least $5 a ton.

On the Kerr-Addison property, which many observers, lay and professional, will think is the prettiest looking of the set, the only work of consequence done is diamond drilling. A little trucking on surface, and a short tunnel near it, can be seen of the work performed in the early days. In these old workings a careless examination reveals free gold, and new shoots put in at random or surface will also expose very handsome showings. In appearance the ore body certainly would seem to have some exceptionally rich spots. About 2000 feet of diamond drilling have been done and the major part of a 10,000 foot order will be expended on this property.

The drill holes are set in to cross at an angle of 45

C. DAIMPRE,
Manager of the Associated Goldfields Properties.

or 50 degrees first from one wall, then from the other. The first hole showed the dolomite band to be 300 feet wide, and a later hole, further along, had it at that place 500 feet wide. The body held its characteristics throughout. An interesting appearance, under surface, was a broad tongue of porphyry. No assays have yet been made of the cores.

Adjoining the Kerr-Addison, on the strike of its big ore body, is the Reddick property of the Associated Goldfields. This is the pioneer property of Larder Lake. It is the first on which gold was discovered, and also makes a bid for fame because of producing the material for the first gold coins minted in Canada.

The work at the Reddick is confined to the 100 foot level, and totals about 1200 feet of drifting and cross-cutting. About half of this was done by former owners, and was not especially expert. The later work has been more objective and resultful. The rocks consist of alternating bands of dolomite and green schists. Two ore bodies, one 50 feet, the other 10 to 40 feet, in width, have been explored. The values are reported to run $10 to $12 the ton.

In August, in a cross-cut to the north, ore closely resembling that on the Kerr-Addison was struck. The last information was that this cross-cut was 75 feet into the ore body and that the condition pertaining to the second round of shots, when free gold was brought out, had continued with every round. In the west drift, which had been following a 50 foot vein, the color and character of the ore changed last month, and as it was known to angle toward this place it is quite possible that the Kerr-Addison body has been picked up here also. The writer saw some of the ore from the later faces (the drift now being 50 feet into the new ore) and it is remarkably prolific as to coarse gold and general mineralization.

The great point is: what measure of success will the Associated engineers have in taking these ores bodies as a whole and milling them. Those who read reports a year old, or who have not visited the properties, may shake their heads wonderingly. But on the properties the observer sees so much coarse "sweetness" scattered through the quartz, sees the stringers matted in a tangled network of quartz and dolomitic material, that he quickly takes in some of the confidence and assurance of those who are footing the bills and adventuring in an enterprise whose rewards, to success, must be extremely high.

Cheap hydro power for "glory holing" mining methods abounds. The company has its own plant on Raven Falls, on the river which flows out of Larder Lake. The plan is to mine the bodies by electric shovels and run the ore to the mills, down inclines, by electric trams. It is an extremely cheap method, this form of open cutting.

As part of its activities the Associated keeps going a small lumber mill, which has cut all the lumber for the camps and mine buildings, and is now cutting material for mill buildings.

Not a handicap, but assuredly a great difficulty to be overcome, is the condition of the road from Dane, on the T. & N. O. Railway, to Larder Lake. Some work was done on it during the summer but that work consists largely of scraping the road-bed into a loose mass and then putting it back and patting it down smooth. The autumn rains have played havoc with it already and it is, if possible, worse than before.

Other interests are working in the Larder Lake district, notably Nipissing, Crown Reserve, and other silver companies, and the old La Mine D'Or Huronia is being put into shape for a resumption of milling within a few weeks. But this article was intended only to take up the "glory hole" plans for the three leading properties.

A. I. M. & M. E. MEETING, SEPT. 22nd AT CHICAGO.

Practically every subject of importance to the American mining world will be discussed at the 120th. meeting of the American Institute of Mining and Metallurgical engineers, which convenes here for a five-day session on September 22nd. This is the 120th. meeting of the Institute and the attendance will include all those prominent in mining, United States Government officials and leaders of industry.

The fact that mine taxation, conservation of coal and new developments in the measurement of high temperatures are subjects to be thoroughly discussed at this meeting has excited great interest among mining engineers. On account of the number of subjects to be presented, a good part of the five days is given up to technical work from which it is expected that there will be developments of considerable moment.

The Institute will take a number of special trips to points near Chicago, including a steamer trip to Gary, Indiana, and rail trips to North Chicago and Milwaukee and nearby coal fields.

It has just been announced by the Institute that Charles M. Schwab will be in attendance and will address the Institute at a banquet on Wednesday evening, September 24th.

The principal session on the opening day will deal with mine taxation ond representatives of the U. S. Treasury will be present to participate in the discussion and to gain the cooperative opinions of the mine owners and engineers. During the day technical sessions will take up non-ferrous metallurgy and metallography; coal and gas; milling; industrial organization and geology. In the evening there will be a smoker at the Chicago University Club.

On the second, September 23rd. the Institute will take an excursion by boat to the plant of the United States Steel Corporation at Gary, Indiana, with technical sessions en route on the subject of iron and steel. in the evening, sessions on oil and iron and stel will be held.

On the third day, September 24th. several hours in the morning and afternoon will be given over to conferences on sulphur in coal, iron and steel and mining and local resources. In the evening President Horace V. Winchell of Minneapolis will hold a reception at Congress Hotel, to be followed by a banquet and dancing.

On Thursday, the interest of the Convention will be centred on pyrometry, a study of high temperatures, and some of the members will take an all-day excursion to the La Salle District to view the coal fields, cement manufacturing, three big zinc works and other industrial developments related to mining.

The Weekly Bulletin of the Department of Trade & Commerce states that a Sheffield (England) importer desires Canadian quotations on cobalt, nickel and ferro-alloys.

Ontario's Metalliferous Production, First Half-Year, 1919

Department of Mines Report.

Returns received by the Ontario Bureau of Mines for the six months ending June 30th, 1919, are tabulated below, and for purposes of comparison the quantities and values are given for the corresponding period in 1918.

PRODUCT.		Quantity.		Values.	
		1918	1919	1918	1919
Gold	ounces	229,421	231,729	4,648,164	4,666,759
Silver	"	8,736,002	5,744,172	8,267,624	5,951,362
Platinum	"		13.6		818
Palladium	"		16.4		987
Cobalt (metallic)	lbs.	118,889	59,337	249,045	93,157
Nickel (metallic)	"	208,802	5,147,745	83,332	1,825,347
Nickel Oxide	"	21,768	5,503	5,551	1,567
Cobalt Oxide	"	259,371	202,912	339,052	301,791
Cobalt Sulphate & Hydroxide	"	222,039	26,289	27,505	16,164
Nickel Sulphate & Carbonate	"		133,732		15,531
Molybdenite, concentrates	"	32,656		45,845	
Lead (pig)	"	776,711	1,481,204	66,630	54,802
Copper (blister)	"		3,080,492		452,055
Nickel in matte (*)	short tons	21,393	7,072	12,385,950	3,535,915
Copper in matte (*)	" "	10,708	4,341	4,283,040	1,128,753
Copper ore	" "	16		318	
Iron Ore, exported (†)	" "	30,741	5,804,	138,018	44,309
Iron, pig (x)	" "	38,130	24,095	1,034,517	670,512
Total				31,574,591	18,759,829

* Copper in matte was valued at 20 cents and nickel at 30 cents per pound in 1918. For 1919 the values have been placed at 13 and 25 cents per pound respectively. The total matte produced contained 10,605 tons of nickel and 5,911 tons of copper. See heading "Nickel-Copper" for explanation.

† Total output of iron ore was 70,955 short tons worth $307,645.

x Total output of pig iron was 305,577 tons valued at $8,503,644. Figures in the table represent proportional product from Ontario ore.

General Remarks.

As a result of after-war conditions there was a material reduction in Ontario's metalliferous production for the first six months of 1919 as compared with the corresponding period of 1918. This is due chiefly to the curtailed production of nickel-copper matte to about half that of 1918, when there was the greatest production of these metals that this Province has ever known. The silver output continues its natural decline, although the price of the metal has been rising steadily. Gold, however, shows a slight increase over both the 1917 and 1918 production. Molybdenite, for lack of a market, is not being mined. The precious metals, platinum and palladium, are now recovered at the Port Colborne refinery of the International Nickel Company of Canada, Ltd. Lead along with most other metals has fallen in price since the close of the war.

Gold, Platinum and Palladium.

Gold production, 231,729 ounces, shows an increase but is still a little under the figures for the first half of 1916, when 235,060 ounces were recovered. Unfortunately the strike at the Kirkland Lake camp, which began on June 12th, is still effective, and that source of gold supply is shut off for the time being. At Porcupine, however, the output is increasing, more particularly at the Hollinger, Dome, and McIntyre mines. During the half year 490,523 tons of ore were milled, of which 465,407 were treated at Porcupine and 25,116 tons at Kirkland Lake for a recovery of 212,895 and 18,637 ounces respectively. As a by-product of nickel-copper refining at Port Colborne gold to the value of $3,921, also platinum and palladium in small quantities as shown in the table of production, were recovered.

Silver.

Despite the high price of silver, which averaged 103,677 cents per ounce for the half year, production from Cobalt declined nearly three million ounces as compared with 1918. There were 28 properties from which shipments were made; those marketing one-quarter million ounces or over are named in descending order: Nipissing, Mining Corporation of Canada, McKinley-Darragh-Savage, Kerr Lake, Miller Lake-O'Brien, Coniagas, O'Brien and Buffalo. On July 23rd a strike was called by the Miners' Union. A settlement in the near future is probable as representatives of both miners and managers are meeting in conference. Even with an early resumption of work

the year's output will be materially reduced by the strike. Of the total output 42,900 ounces were recovered from gold ores and 11,714 ounces from the refining of nickel-copper matte. The Miller Lake-O'Brien and Crews-McFarlan mines at Gowganda contributed 409,344 ounces of the total, the balance coming from Cobalt proper and Casey township. Seven shippers were paid for the Cobalt content of the silver ore, receiving therefore $16,737. The ore testing and sampling plant at Cobalt, formerly operated by Campbell & Deyell, was purchased by the Ontario Government on May 8th, and since that date has been under the management of A. A. Cole, Mining Engineer of the T. & N. O. Ry. Commission.

Silver-Cobalt Refineries.

In addition to metallic cobalt and nickel and various compounds of these metals, as noted in the table, Southern Ontario refineries recovered 2, 659,569 ounces of silver and marketed 1,949,280 pounds of white arsenic. This production came from plants located at Deloro, Thorold, Welland and Chippawa. Nickel metal from these refineries to the extent of 106,023 pounds was marketed for $37,119.

Nickel-Copper.

Since July 1918, when the production of refined nickel and blister copper by the International Nickel Company of Canada, Limited, began at Port Colborne, Ont., the total quantities of nickel and copper in matte do not appear in the table production. The figures given represent the shipments of matte to the United States and Wales. The close of the war found the nickel companies over-stocked, and consequently the price fell and production was curtailed. Until the surplus stock has been absorbed nickel-copper matte production will not increase even to a pre-war basis. Ore smelted in the period totalled 370,541 tons as compared with 717,119 tons for the corresponding period in 1918. Ore shipped from the Alexo mine to the Mond Company smelter was 2,215 tons and the British America Nickel Corporation on June 30th had 46,814 tons stock-piled.

Iron-Ore and Pig-Iron.

Of the total output of iron ore 65,151 tons went to Ontario blast furnaces, and 5,804 tons were shipped out of the Province. The Magpie and Moose Mountain mines were the chief producers.

Four iron furnaces at Sault Ste. Marie, two at Hamilton and one each at Midland, Parry Sound, Port Colborne and Deseronto were in blast. Foreign ore smelted in the period was 598,581 tons and Ontario ore 31,238 tons. The total output of pig-iron was 303,577 tons worth $8,503,644; steel 296,081 tons worth $8,770,717 and 23,955 tons of spiegel valued at $868,-148. The Algoma Steel Corporation now makes in its own ovens all the coke required in its plant, the output being 183,970 tons for the period.

Nova Scotia Notes

Coal Export Business Developing.

Some indications of a return to pre-war operating conditions are shown by recent news from the collieries in Nova Scotia.

An export trade in coal is being done, which is understood to consist largely of coal delivered to vessels calling for cargo. There have been newspapers reports of large contracts made with European buyers, but so far the bulk of the new business has been done in the supplying of cargo to foreign owned vessels that have been compelled to come to this side for coal because of the European shortage.

In this connection shipping is a more important consideration than the coal supply itself, and there is an unlimited market in Europe at the present time, and for an indefinite period to come, open to Canadian coal companies that possess vessels free to trade to Europe. The Nova Scotia Steel Company is understood to be taking advantage of the opening, having put the S.S. "Wascana" into the coal trade, together with another freighter the operation in which was obtained by the purchase of the coal-shipping plant of the Imperial Ministry of Shipping at the Terminal Wharf in Halifax.

The Scotia Company have sold a number of cargoes for Italian and French destinations.

The Dominion Coal Company are also obtaining considerable export business for Holland delivery and for Scandinavian ports. It may be taken for granted that the Nova Scotia companies have absolutely no intention of relinquishing the business in the Montreal market which they have been at such pains for so many years to cultivate, and a larger quantity will be delivered in the Montreal district before the ice forms than has been sent up the River since the 1915 season, but at the present time, if freights are obtainable, the European market offers more profitable sale and it will be surprising if the Nova Scotian operators do not take full advantage of it.

Colliery Extensions.

Another encouraging sign is the commencement of development work, after an almost complete cessation for five or six years. If development work had been much longer delayed, the aspect of the future of the Nova Scotia coal industry would be worse than it is, and even with new extensions and developments pushed to the utmost during the next five to ten years, it will not be found possible to make up the leeway that has resulted from the complete discontinuance of new developments during the war period.

Dominion Coal Company.

It is understood that the Dominion Coal Company are re-opening the No. 17 Colliery—more familiarly known as the Old Victoria Mine. This is one of the collieries that was acquired by the Dominion Company when it was incorporated. Along with the Gardiner Mines and others it was closed down when the Company developed its policy of working only the Phalen seam collieries concentrated in the district of Glace Bay. Just previous to the war, the mine was pumped out, and the main haulage way was re-timbered and some development work done at the foot of the deeps. An extensive surface layout was planned, and a few buildings were erected, but when the needs of the army commenced to shorten the available labour supply, the extension work was discontinued, and only sufficient force was kept at work to maintain the mine in order and to keep it ventilated and pumped out.

The production of No. 17 was brought up to about 2,000 tons monthly just previous to the outbreak of war, and it will not be possible to increase the output beyond a few hundred tons daily until the surface equipment is installed. The lower workings of this colliery are dipping quite steeply, between 30 and 40 degrees, and the conditions of operation will be found probably more difficult than in any of the other collieries of the Dominion Company.

The coal is of excellent quality, and in the days when the mine was independently operated, "Victoria Mines" coal had a wide reputation.

A large colliery village had been erected before the war, and is available to house any new workers obtained. The houses are of modern design, well spaced and most healthily situated, the surrounding country being a pastoral and long-settled farming district.

The Dominion Coal Company is also making preliminary investigations, of a prospecting and testing nature, to determine the advisability of re-opening the Gardiner Seam. This is a seam of good quality, about 4′ 6″ in thickness, well adapted for longwall operation. It underlies the whole land and submarine areas of the Dominion Company in the Glace Bay District, and has mined only to a very small extent. This is one of the seams that was reserved for future development when the Dominion Company in 1893, as previously mentioned, concentrated its operations on the thicker and more accessible seams on its properties.

The Dominion Coal Company also controls the properties of the North Atlantic Collieries at Port Morien, where there is a very large submarine area of coal awaiting future development. This submarine area may in years to come assume importance second only to the submarine tract off Glace Bay and Waterford.

As previously mentioned, the Dominion Company are also sinking a new shaft to the Phalen Seam near No. 2 Colliery, and are understood to contemplate a second new shaft to develop the submarine area off Glace Bay tributary to the Caledonia Colliery area.

Nova Scotia Steel and Coal Company.

The Scotia Company is testing the Stubbert seam near Point Aconi, but nothing beyond a preliminary operation is as yet contemplated.

It is also reported that the Scotia Company intend to erect a by-product coking plant at Sydney Mines, and to further develop the system of electrical operation of its collieries by the power derived from waste gases which it has followed for a good many years. While it is known the Scotia Company have for some time been studying plans for such a coking plant, no official confirmation of the report has been announced, and it may therefore be presumed that future plans are as yet only in a formative stage.

The coal production of the Scotia Company has shown a marked improvement of late. An aggressive policy is being pursued by the management. A good many additions to the official staff of the Company have recently been made, and the collieries are working practically full time. The production of the Florence Colliery has in particular been increased.

THE HUNTINGDON MINE.

..Mr. F. M. Connell has returned to Toronto after being for some time at the Huntingdon copper mine at Eastman, Quebec. He reports that very satisfactory results are being obtained. Shipments of concentrate are being made regularly. A first class compressor which had been installed during the war on a chromite property near St. Cyr has been purchased by Mr. Connell's company, the Eastman Mning & Milling Co. Ltd., and will be installed at the Huntingdon.

CANADIAN COAL MEN.

Alexander Mc. Eachren, and Alexander MacDonald, Asst. General Superintendents of the Dominion Coal Company.

The operating officials of the Dominion Coal Company have usually been selected from amongst the employees of that Company, who in turn have been, and are still very largely, recruited from amongst the descendants of Scotch Highlanders who settled in Cape Breton Island, and have left an indelible impress on the place-names of the Island and the racial characteristics of its population.

At one time, almost without a single exception, the mine managers and superintendents of the Dominion Coal Company were born in Cape Breton Island, or at any rate not outside of Nova Scotia, and boasted the hereditary prefix "Mac" as part of their names.

The skill of these men as coal-miners was in the first instance inherited from their fathers, and perfected by early acquaintance with the "coal-face". No better examples of practical miners are to be found that these same Nova Scotians, who have made their mark, not only in New Scotland itself, but in every mining camp of this Continent, from Mexico to the Yukon. The gold nugget worn as a personal souvenir, with the blue scars of coal-dust in old cuts and abrasions, added to other signs that the initiated may recognise in the free masonry of the miner, tell the history of some Nova Scotia's wandering sons, who, by the way, wandered in just the same old way, and with the same old spirit into the fighting in France, and left their marks on "Fritz" for a change.

That, however is another story, which someone may someday gain fame by relating, for the story is one that will bear embellishment.

ALEXANDER McEACHREN.

Among the sons of Cape Breton who made their mark at home, being both beyond the military age but not nevertheless of pacifist disposition — at least not remarkably so — are Alexander MacDonald and Alexander McEachern, in the differing spelling of whose paternal prefix there is written much history.

Alexander McEachren has filled every capacity in the employment list of a colliery, having commenced as a trapper boy and risen through successive grades to the position of Assistant General Superintendent of the Dominion Coal Company. He has taken a leading part in the mining schools of Cape Breton, having assisted both as teacher and by his personal interest and influence to make this form of instruction as adequate as the appropriation of the Local Government will allow. Mr. Mc. Eachren has always been a student of mine safety, and in this respect has kept well in advance of his times.

He is a member of the Standing Examination Committee of the Province for the granting of certificates of competency, and a Councillor of the Mining Society of Nova Scotia. Previous to being appointed to his present position, Mr. McEachren was for eight to nine years Superintendent of the Waterford district of the Dominion Collieries, which includes the Collieries Nos. 12, 14, 15, 16 and 17.

Alexander MacDonald, likewise, has had a life-long experience in the Cape Breton collieries, and previous to being appointed to his present office was for nine years a Superintendent of No. 3 District, and before that was Manager of Caledonia Colliery for about nine years.

Both the subjects of this sketch have had experience in the harder tasks of a colliery official's life, having been intimately concerned with mine fires and explossions, and were it not that we defer to the general objection of conscientious mine officials to public announcement of their virtues, we could say many things that would sound like flattery, but would be merely a plain recital of incidents that are part of the ordinary duties of the responsible colliery official, and which the profession does not advertise.

The "twa Sandies" of our text are bound for the "top level" by different routes, but the writer imagines that before the Great Assize they will both obtain certificates of competency. At least he would not mind taking a chance with either for company.

ALEXANDER MacDONALD.

FIRST INTERNATIONAL MINE-RESCUE AND FIRST AID MEET IN THE PACIFIC NORTH WEST

(Reported by our Special Correspondent.)

An international competition in Mine Rescue and First Aid Work took place on Labor Day, the 1st. of September, under the auspices of the Vancouver Island Mine Safety Association, at Nanaimo, B. C. As it was the first held in Western Canada to be attended by representatives of the coal mining districts of the States of Washington and the first for a number of years to bring teams from the Crow's Nest Pass Coal Field, Eastern British Columbia, the event attracted unusual attention and the added interest stimulated those entering to special training. The result, it is admitted frankly, was a disappointment to the Canadians. The men from the Pacific Coast Coal Company won the British Columbia Championship Shield and second place was taken by the team representing the Roslyn Fuel Company. Consequently the trophy has left the Province for the first time. It must not be supposed that the British Columbians were anything but good losers. They congratulated the victors spontaneously and warmly, their sentiments being well expressed by Hon. Sloan, Minister of Mines, when, in the course of the presentation of the prizes, he said that, while the visitors unquestionably had won on their merits and so were entitled to the hearty congratulations of which they had been the recipients, they would find the Canadians back next year determined to reverse the present decision.

There were nine teams entered. Besides the two from Washington State the Canadian Western Fuel Company, of Nanaimo, B.C., had three, the Crow's Nest Pass Coal Company, Fernie, B. C., one; the Granby Company's Collieries, Cassidy's, one; and the Canadian Collieries (D) Ltd., two; one from the Extension and the other from the Cumberland mines. Of these the Cumberland team only was equipped with the Draeger Apparatus. Those from the Roslyn Company and from the Canadian Collieries (D) Ltd. (Extension) used the Paul while the remaining six teams were provided with the Gibbs. The usual boarded structure represented the mine and the problem, which was not varied, was that an explosion had occurred and the miner to be rescued had barricaded himself in against the gas, the ventilation, of course, having been cut off. It was simply stated that the said miner was alive, nothing being given as to whether he was injured or overcome. For this reason it is interesting comment that all the teams bore the patient from the mine on a stretcher, none taking advantage of the opportunity

to merely walk him through the bad air to the surface with a breathing machine as protection. The judges were James Bagley, State Mines Inspector for Washington; R. Schonning, manager of the United States Bureau of Mines Staff, Washington State; George Wilkinson, Chief Inspector of Mines for British Columbia; and Dudley Michel, Instructor in First Aid and Mine Rescue Work for the Provincial Department of Mines.

An analysis of the marking of the judges is illuminating because it shows that the competition was won and lost, not in actual mine rescue work but on the testing benches where the judges, Messrs. Michel and Schonning, presided and where the apparatus of the contesting teams was subjected to a rigorous test prior to being buckled on the men. The Fernie Team was the first to go through. They had no trouble with the Gibbs machines, escaping without a deduction because of "loose joints or connections." In mine work, however, thirty-six points were lost. A leak cost the Roslyn Team, ten points, while twenty-four were dropped in the mine. The Pacific Coast Coal Company's Team, Black Diamond, winners of the Shield and Championship, were penalized ten points for a leaky point or connection and fifteen for their performance in the mine. Laird's Team, of the Western Fuel Company, lost sixty points for leaks in apparatus and five in mine work. The Extension Team dropped ninety points for leaks in apparatus and forty-five for their work in the mine. The remainder may be summarized as follows:—

	Loose Joint or Connection.	Mine Work
No. 2 Team, Western Fuel Co., Nanaimo	30	40
Cumberland Team, Canadian Collieries (D) Ltd.	70	35
Granby Collieries (Cassidy's)	100	49
No. 3 Team, Western Fuel Co., Nanaimo	30	20

It will be seen from the above that there were two teams which stood, in actual performance in the mine, head and shoulders above the others, viz., that the Pacific Coast Coal Co., Black Diamond, and No. 1 (Laird's) Team of the Western Fuel Company, Nanaimo, B. C. Although, as stated at the outset, the Canadians are not disposed to withold any of the credit due those who came from the other side and took the honors they, quite naturally, feel that it is rather too bad that the decision should have gone against them solely because of minor leaks in apparatus, located through the severe tests of soap suds and penalized, when found, to the maximum extent. Mr. Laird and his men point out, too, that the apparatus which they used had previously been through the test, in the hands of the Fernie team, without a leak being found and that that experience no doubt accounted for what looseness subsequently developed. Of this there cannot be any doubt: that the Black Diamond and the Nanaimo Teams were the best in actual mine rescue work on their showings in the competitions under review and that the Laird Team, apart from the discrepancy found in their apparatus, must be congratulated on their performance in the mine. They did so well that it has been suggested that they should be sent to Pittsburg for the forthcoming international meet. In passing it may be observed that the "soap sud" test no doubt was the result of the very keen competition between the Gibbs and the Paul apparatus and their representatives on the Pacific Coast. The former was represented by H. H. Sanderson, the western manager of the Mine Safety Appliance Co., and George Riggs, the factory expert; and the latter by A. G. Menny, of the American Atmos Corporation.

Other prominent coal mining men who watched the contests with interest were Stephen H. Green, manager of the Pacific Coast Coal Co.; Harry Freeman, superintendent for the same company at Black Diamond; Wm. Shaw, superintendent of the Roslyn Fuel Company; Thomas Graham, General Superintendent of the Canadian Collieries (D) Ltd; J. J. Grant, manager of the Nanoose Collieries Ltd.; John Hunt, superintendent of the Canadian Western Fuel Co.; and officials of the B. C. Department of Mines. Among the guests of honor was Hon. Wm. Sloan, Minister of Mines, through whose influence as a member of the government a substantial grant had been obtained to defray the expenses of the event. Mr. Green, of the Pacific Coast Coal Co., was delighted with the success of his men and has no hesitation in predicting that they may be depended upon to bring honor to the west at Pittsburg.

In the First Aid Competitions the honors were fairly evenly divided, the results being as follows:—

Department of Mines Cup: I. J. W. Jemson's Team, Nanaimo, B. C.; 2, George Carson's Team, Nanaimo, B. C.

One Man Event: I. J. S. Murphy, Pacific Coast Coal Co., and Julius Tonda, patient; 2, R. Charnock, Nanaimo, and J. McCourt, patient.

W. L. Coulson Cup: 1, Jeo Barton's Team, Nanaimo, B. C.; 2, J. Brown's Team, Nanaimo.

Juvenile Cup, open for annual competition and offered by the Vancouver Island Mine Safety Association: 1, Ladysmith, R. Ferguson, captain; 2, Nanaimo, R. Jackson, captain.

Two Men Event: 1, Nanaimo, A. McNeill, captian; 2, Roslyn Fuel Company.

Open Event, (open to all working miners): 1, Nanaimo, Joe Barton, captain; 2, Nanaimo, A. McNeill, captain.

Mr. Sloan, in an address delivered in connection with the prize distribution, stated that as long as he held office he would do his utmost to assist mine safety competitions, believing them to be important in advancing the welfare of the coal miners. He was proud to have been identified with the first international Meet of the kind in the Pacific Northwest.

Special Correspondence

BRITISH COLUMBIA.

Slocan, B.C.

The first shipment this season from the Black Prince Mine, situated on the divide between Lemon and Springer Creeks, has been sent to the Consolidated Mining & Smelting Co.'s smelter at Trail, B.C. This is a silver-lead property of promise. The Black Prince has been developed to some extent and in the process has passed through the hands of a number of operators. J. E. Tipping, the present owner, has been in possession for the past four years and the best car of ore taken from the mine was shipped by him. The average return in this case was about 200 ounces of silver to the ton.

Nelson, B.C.

Reports reaching here are to the effect that work is proceeding on the Lucky Boy and the Security Mines of the Erie District which, together with the Second Relief Property, suffered by fire on the 16th of July last. S. L. Myers, superintendent of the two former properties, is engaged in getting out timber for a new bunkhouse and for other buildings. In the meantime Mr. Myers is camping in the tunnel of the Lucky Boy.

There is considerable activity at the Eureka Mine, Eagle Creek. W. M. Myers, the superintendent, is surveying preparatory to the installation of a new aerial tramway from the upper terminal of the Granite-Poorman Mine tramway to the lower adit of the Eureka workings, which will be about 3,000 feet in length. The Granite-Poorman Mine tramway, running between the mill and Granite siding, a distance of 3,000 feet, is being dismantled and the material will be put in the new line. The tramway being removed was utilized originally to facilitate shipment to the smelter. The Granite mill is running steadily on two shifts, handling ore from the upper levels of the Eureka. A crosscut is being driven on the latter property which will give 450 feet depth on the vein. There have been a number of visitors to the Eureka from Walla Walla recently, among whom were Mr. and Mrs. C. E. Nye, the former being the president of the Inland Mining Company, which is responsible for the work outlined.

J. W. Evans, manager of the Mountain Chief Mining Company, announces that a shipment of 200 tons is being made to the Consolidated Mining & Smelting Co.'s smelter at Trail, B.C., this being the first ore to go from this copper property under its present management. Development has been underway since last February. The ore body, which at first was chalcopyrite, acquired a substantial percentage of bornite as the shaft made depth. It now is being developed by a lateral drift, which was started at a depth of 60 feet, with a face of 9 feet. The general character of the ore is being maintained.

Lardeau, B.C.

Antimonial lead ore is said to have been struck on the E and M claim, Cascade Creek, Lardeau District. The vein averages six feet in width and carries a sixteen inch streak of dense sulphide that is reported to assay 21.5 per cent lead and 7.4 ounces of silver per ton. The ore was found while sinking for a rich silver vein that was worked two years ago.

The Panama, a dry-silver property situated at Bear Lake, Lardeau District, has been re-opened after an idleness of 18 months by H. Giegerich, of Kaslo, B.C. A long drift on the ledge, which is designed to get under the showings above, is being continued. The tunnel now is in a distance of 370 feet and it is estimated that it still has about 200 feet to go to reach the ore body. The Panama is opposite the Lucky Jim Zinc property. It was owned for fifteen years by the late J. P. Miller and Giegerich and, on the former's death, passed to the latter, who now is the sole owner.

Sandon, B.C.

Work on the Ruth Mine at Sandon, B.C., which has been prosecuted on the lower or mill level, has resulted in cutting the veins about 600 feet from the portal of the tunnel. At that point the vein is about eight feet wide and there is every indication that further development will show up a good ore body.

Edgewood, B.C.

A quantity of rich ore was uncovered in the course of the performance of assessment work on the claim of W. J. Banting, Lightning Peak. It is expected that active development will result. The outcome was a rush to the district by prospectors and the staking of all ground adjacent to the Banting claim. It is reported that on the Waterloo Mineral claim rich carbonates, running from 4,000 to 9,000 ounces of silver to the ton, have been discovered and that the owners have about a ton of it ready for shipment.

Salmon River, B.C.

The operators of the Premier Mine, Salmon River, propose to experiment with a motor-sled to transport ore over the snow during the coming winter.

Dawson, Y.T.

It is estimated that the total gold output of the placer camps of the Yukon Territory and of Alaska will be $5,250,000. To this may be added half a million dollars if the districts of Atlin, Northern British Columbia and of Nome, Alaskan Coast, are included, each of these sections being given credit for a quarter of a million. This computation is up to the close of navigation which will take place next month. Another half a million may be yielded by other scattered camps throughout the north so that it is possible that the aggregate will reach $6,250,000 for the year 1919. All northern camps are led by the Klondyke, with Dawson as the center, its season production being placed at $2,000,000. Second place is taken by the Tanana Valley as Fairbanks, Talovana and the Hot Springs are credited with $1,500,000 or more. On his return from a tour of the posts controlled by the Northern Commercial Company, Volney Richmond, the company's superintendent, estimates the season's placer gold yield as follows: Dawson, $2,000,000; Fairbanks, $800,000; Iditarod, $750,000; Talovana, $700,000; Kuskokwim, $250,000; Circle, $225,000; Ruby, $125,000; Kuyukuk, $100,000; Marshall, $75,000; Hot Springs, $60,000; Ophir, $50,000; Rampart, $25,000; Chandlar, $20,000.

Vancouver, B.C.

On his return from a tour of Northern British Columbia, in the course of which he visited Alice Arm, Anyox, and other mining centres, Hon. Dr. King, Minister of Public Works, stated that he noted a marked increase in mining activity and that a spirit of optimism was apparent, which had been lacking in recent years. He inspected the Dolly Varden Mines and the railroad operating between tidewater at Alice Arm and the mines, a distance of eighteen miles, construction of which was authorized by the Provincial Government. Dr. King states that it is the intention of the Taylor Engineering Company to extend the road for four miles next year, thus affording transportation facilities to other properties now being developed and which are making excellent showings. There is promise of a large tonnage being offered the railroad and the management is anxious to handle as much as possible, not only that the mineral deposits of the country may be made to yield, but that the railroad may be made to pay running expenses.

Alice Arm, B.C.

When Hon. Dr. King visited this centre he met the members of the Alice Arm Commercial Club to discuss the report that the Taylor Mining Company had refused to accept freight for transportation by the Alice-Dolly Varden Railroad from any source save the Dolly Varden mines. A. J. T. Taylor, manager of the company, also was present. When asked whether the railway would be able to take ore from outside sources Mr. Taylor stated that much would depend on how the road and equipment stood up under the tests soon to be made, but if he could possibly see his way clear in the face of the many complications involved he certainly would help out prospective shippers to the limit of his ability.

Subsequently Mr. Taylor reported that the Dolly Varden Mines were making a daily production of 100 tons of good grade ore and that regular shipments were being made over the new road to tidewater and thence by boat to the Anyox smelter of the Granby Consolidated Mining & Smelting Company. This would continue as long as weather permitted. Under Majors Young and Davis, both mining men recently returned from overseas, splendid progress had been made at the mine. A steam compressor and a 2,000-foot aerial tramway were in operation and the whole property now was as fully equipped mechanically as the difficulty in obtaining machinery would permit. It had been necessary first to complete the railroad and the aerial tramway before opening the mine to any extent.

Discussing conditions in the Alice Arm District, Mr. Taylor said that more engineers and prospectors had gone into the country than during any five years preceding.

Cowichan, B.C.

The B.C. Manganese Co., Ltd., are making good progress in the development of their properties at Hill 60, some twelve miles west of Duncan. Two carloads of ore, containing fifty tons each, already have been shipped and it is expected that a carload will go forward every three or four days. In the first instance the ore was brought down the hill by teams. Subsequently, however, motor trucks were put on the work and the results are said to be satisfactory. In its initial stages the mining was of a quarrying nature. Recently however, a steam plant was installed and production has been materially increased.

Victoria, B.C.

After a two weeks' trip through the country of the Kokahala River, British Columbia, Charles Camsell, of the Dominion Geological Survey, has returned. He surveyed gold deposits along the line of the Kettle Valley Railway from Hope to Jessica, and reports having found some quartz veins rich in gold. The "Emancipation Mine," however, is the only lode being worked in the section and, although it contains high grade ore, it is being operated in a small way, this being due to the excessive cost of labor and machinery. The same veins, he said, run across the Fraser River above Yale and have been prospected to some extent. They have supplied in the slow process of erosion much of the gold which has been taken from the placers of the Fraser and other streams.

Grand Forks, B.C.

The Canadian Consolidated Mining & Smelting Company is installing three decrepitating furnaces and rotary kilns at the Rock Candy Fluorspar mine near Lynch Creek, near Grand Forks, B.C. Since the completion of the concentrator at the property early this year experiments have been in progress in the treatment of this ore and it is said that Supt. A. A. Robertson, who is in charge, has met with success with the decrepitating process, something new for this Province, and which generally speaking consists of the breaking of the ore by means of a decrepitating furnace and rotary kiln, crude oil being used as fuel. One unit of the process was first installed and the results being satisfactory it was decided to instal three more. When these are operating it is expected that the plant will handle about 100 tons daily and it is anticipated that the demand for fluorite assures the continuous operation of the mine and plant.

No Reason For Stampede in Koyukuk Region.

From Fairbanks comes the report the prospects uncovered on Bettles River last spring do not warrant a stampede to that district at this time. All the ground on the creek has been staked but there will probably be no more work done until next winter.

From all indications there is a good chance that the country will turn out all right, but it will have to be developed in the future as nothing definite in the way of pay has been lined up.

This is no time for a stampede as everything is staked now and if anything develops during the winter, lays can be secured next year. Men going to the Koyukuk should have $1,000 in cash or its equivalent in grub as it will take that amount to run them through the winter.

Good prospects are also reported recently on the Hog River. About thirty-five men are preparing to spend the winter on this river, which is 300 miles from the mouth of the Koyukuk. Old timers are convinced that something good will be found there next winter.

The Yukon.

News from Mayo states there has been a strike in that vicinity. This is supposed to be the new silver find on Lightening Creek made by Louis Bouvett.

No definite news has come out up to the present writing.

Rich Strike Reported From Taku.

Reports from Juneau are that there has been a rich strike in the Taku district. Inklin is the present head of transportation on the Taku River, and is about 75 miles from the Coast.

University of British Columbia Has Two New Professors.

The University of British Columbia has added two new professors to its force of instructors. Professor H. H. Thompson, Bachelor of Science from McGill University comes to the chair of Metallurgy. The larger portion of M. Thompson's time since leaving McGill has been taken up with professional work in Canada and the United States. He was chief Metallurgist for some large mineral interests in Arizona and Utah for some time. Mr. Thompson is a Canadian and his desire to return to Canada and educate his children here has influenced him to accept the professorship.

The other appointment is Mr. George A. Gillies, M. Sc., to be assistant professor in Mining. M. Gillies is also a McGill man, who has a great deal of experience with the mechanical branch of the mining industry.

NORTHERN ONTARIO

The Gold Mines.

Hollinger Mine.—Producing at a rate of well over $7,000,000 annually, and soon to increase this output to an average of perhaps $10,000,000 a year, the reducing plant of the Hollinger Consolidated Gold Mines represents one of the largest and most modern of its kind in existance. Certain additions being made to the plant will increase its capacity from about 2,800 tons to not far under 3,500 tons daily. The ore contains an average of over $6 to the ton and may be estimated to yield profit approximateing half that amount. The company is capitalized at $25,000,000. Producing at the rate of $10,000,000 a year and realizing a net profit of $5,000,000 a year it can be seen that dividends at the rate of about twenty per cent are indicated for the not far distant future. Even producing at such a rate there is already ore blocked out and in sight sufficient to keep the mill running at full capacity for over four years. In addition to this it is considered not improbable that the new ore developed from year to year may for some time exceed the amount taken out with the result that ore reserves should be maintained for several years ahead of production and for a good many years to come. It is the ambition of General-Manager A. F. Brigham to establish a five-year record that will surpass in volume any previous record set by any other gold mine in the world.

The next few months will see the completion of the construction work. The amount of money being spent on construction each year by the Hollinger is very considerable. This has been an important factor in adding to the operating costs. With this factor reduced to ordinary upkeep of the equipment, the reduction in costs should be considerable.

It is considered not improbable that during 1920 the higher degree of efficiency as a result of more satisfactory working forces, taken together with lower cost of supplies and the elimination of construction work, the average cost of production might reasonably be reduced perhaps as much as a dollar a ton as compared with the past year. Treating 3,000 tons daily or nearly 1,100,000 tons of ore annually, it can readily be seen that this saving would alone amount to over four per cent on the company's issued capital.

Estimates recently made as to the earning capacity of the Hollinger and which indicated about 18 to 20 per cent net profit appear to have failed to take the foregoing facts into consideration.

Dome Mine.—As near as can be ascertained the Dome Mines is now realizing a net profit at the rate of about thirty per cent on its issued capital. It is stated, as pointed out last week in these columns, that about 900 tons of ore was being treated daily and an output of about $250,000 being recorded monthly. Of this, it is estimated about fifty per cent. is net profit, or to be conservative about $100,000 should represent net profit.

Capitalized at 500,000 shares of the par value of $10 each and with only 400,000 shares or $4,000,000 issued, the Dome need only earn $66,600 net profits monthly to meet its former rate of dividends of 20 per cent. Provided the company is actually earning $100,000 net profit monthly, the return is equal to 30 per cent. on the company's issued capital.

This record is being achieved at a time when the mill is running at about 65 per cent capacity. In due course, when running at full blast, it is not unreasonable to anticipate an achievement bordering on the sensational. Even now it is evident that the percentage of net profit being realized on the Dome Mines is higher than any other gold mine in Canada. This is made possible due to the low capitalization, a condition which appears certain to shower exceptional advantages upon the holder of Dome shares.

McIntyre-Porcupine.—It is expected that the annual report of the McIntyre-Porcupine will be mailed almost immediately to the shareholders. The company's year ended June 30th. In order to comply with the law it is necessary that the report shall be issued within ninety days after the ending of the year. Thus, September 30th would be the last day. The current fiscal year of the company already shows signs of being the best in its history. It is expected that for the first time, the current year's output will exceed the two million dollar mark. Development work at depth continues exceedingly favorably according to reports just to hand.

Shareholders of the Plenaurum Mines, which is under option to the McIntyre-Porcupine Company, are evincing a good deal of uneasiness. To them, or at least to a good many of the minority holders, the terms of the agreement remain somewhat of a mystery.

Rumors are current to the effect that a change in terms is under contemplation. It will be recalled that last fall an extension of time was secured. The time will soon again be up, hence the speculation as to what will be done. In some quarters it is rumored that the 500,000 shares of the Plenaurum may be made exchangeable for shares in the McIntyre on a basis of one share of Plenaurum for two shares of the McIntyre.

Tough-Oakes' Gold Mines—According to current rumors, all is not running as smoothly as might be desired among certain of the interests involved in the Tough Oakes' Gold Mines. It is believed, however, that any differences that may arise will not imperil the company holdings, but, rather, may be confined to individual controversy. The prolonged litigation between the present Tough-Oakes' control and the Foster interests is still fresh in the memory of mining men of this district, particularly the shareholders of the company. The affair was regrettable in every sense of the word, having retarded the development of the mine itself and having been a draw back to the Kirkland Lake Camp. With the past experience still fresh it is thought that every reasonable effort to agree will be exhausted by those concerned in the present rumored dissension.

Dr. H. C. Cooke, geologist in the service of the Dominion Government is in the Larder Lake field where it is understood he will remain for the balance of this season. The field work being done by Mr. Cook will of necessity have to deal with that area recently covered by Percy C. Hopkins for the Ontario Bureau of Mines and covering which the Ontario Bureau issued a very recent report. Considerable wonder is being expressed as to the object which the Governments have in mind. For instance, last year the Ontario Bureau of Mines issued a report on the Matachewan Gold Area, the field having been done by A. G. Burrows. A few months later the Federal Government covered the same ground by sending in Dr. Cooke. A repetition of this proceedure in the Larder Lake district, therefore, could not do otherwise than to add to public curiosity.

At a time when numerous gold finds are being reported in various parts of the Dominion, prospectors of this country should bear in the mind the fact that the best place to search for mines is in the vicinity of the known mines, is the assertion made to the writer by a prominent geologist. Far away fields look green, and in a good many instances may prove to be as they appear, or they may not. The mineral wealth of Northern Ontario, he declared, has been demonstrated to be enormous and offers opportunities for the prospector. Everything is in its favor. Transportation, geological conditions and proven merit all combine to make it more attractive perhaps than any other field in the world.

Not to mention the leading camps of Porcupine, Kirkland Lake and Boston Creek, and make reference only to the prospective camps in this district such as Fort Matachewan, Larder Lake, West Shining Tree, Bourkes, Lightning River, etc., it is probably true that any one of these if found in some far away field would cause a large number of prospectors to leave this country. Therefore the words of caution offered by the geologist referred to above should not be taken lightly by Northern Ontario prospectors.

One point which has been exceedingly noticeable of late is the fact that finds which cause sensational reports to circulate in new and far away fields is found to receive but ordinary notice in Northern Ontario. The fact is that so rapid is the growth of the industry in this district that favorable developments have become quite commonplace with the result that they receive but passing mention whereas finds in new districts stand out more prominently.

The Silver Mines.

McKinley-Darragh.—During the first seven months of the current year the McKinley-Darragh realized net earnings almost sufficient to cover the full year's dividend disbursements of 3 per cent. quarterly. As a consequence of the labor strikes during the third quarter of the year the financial position of the company was not seriously impaired. Allowing the balance of September to gradually work back to normal production, a full quarter will still remain in which to accumulate a surplus over this year's dividend requirements and thus still further strengthen the treasury for the coming year.

It is significent to learn that during the first half of 1919 the cost of producing silver at the McKinley-Darragh averaged less than 60 cents an ounce as compared with an average of over 68 cents an ounce during 1918. Not only would this tend to indicate a gradual decline in the cost of material but would also indicate a higher degree of efficiency.

Using the first half of 1919 as a basis of calculation it is very interesting to note that the cost of producing silver declined at a number of the important producing mines of Cobalt. The impression seems to be that the peak was reached during 1918 and that from now on the lower cost of material and the higher working efficiency will for some time serve to permit the realization of an increasing margin of profit.

As a result of the favorable turn in the economic situation as already demonstrated, the dividend record of the mines may be expected to swell. With silver maintaining the highest average in Cobalt's history and with the cost of production on the decline, a prosperous period appears to be in store.

THE NORTHERN LABOR SITUATION.

Co-operation in the Porcupine Camp.

The mine workers in the Porcupine fields have reason to feel keen satisfaction over the outcome of the contest waged by labor in other mining centres throughout the country. Without any sacrifice on their part beyond reasonable co-operation with the representatives of the mining companies, the workers of Porcupine won the advantage of a very satisfactory minimum wage. Not only that but they are to participate in a system of insurance against illness as well as share the advantages of co-operative stores being operated by the leading mining companies.

The attitude of the workers of Porcupine throughout the period of industrial unrest has been doubly commendable for the reason that their course was chosen as a result of their own judgment and not as a result of examples set by other bodies of workmen in this country. From the beginning they appeared to recognize that the mining companies, like the individuals, were battling for an existence and that a solution lay not through a clash of ambitions but by wholehearted co-operation. In this way they have achieved the maximum wages and the minimum of hours and every reasonable concession that could be borne by the mining industry which supports the community,—all this without needless sacrifice.

Their attitude throughout has been business-like. Recognizing that it would be impossible to take blood from a stone, they at once began to plan a way in which the greatest good could be derived from their source of income. In sharp contrast to this is the manner in which the men of the Kirkland lake camp took an attitude of total disregard for the welfare of the companies. Incidentally they stopped at its source the means of livelihood of upwards of 500 men. The Kirkland lake strike has been in force exactly three months, and may continue for some time. Also, it is certain that when it does end, the workers will not be in as favorable a position as when they lay down their tools three months ago. The affair will represent a loss of time and much sacrifice, and with nothing gained for the reason that there was nothing that could be gained in that the industry was already paying all that could be borne.

The Strike Collapse at Cobalt.

The strike of the Cobalt Miners' Union collapsed on August 7th, after having lasted forty-six days. The thing was doomed to fail at its beginning. The men have returned to work without the Union having gained its chief demand for recognition, the number of working hours remains the same, and the combined wage and bonus amounts to the same as before the strike was called. Like all other affairs of the kind, it collapsed under the sheer weight of its unjust cause, and it probably marks the grave of the Western Federation of Miners' in this country.

As the workers of Cobalt return to their employment for which they receive higher pay than that obtainable for similar work in any other part of the country, they are likely to turn about and take stock of that lies in the immediate past. They see a loss of time amounting in the aggregate to close to one

hundred thousand work-days; they see a loss in payroll of close to half a million dollars; and, perhaps worst of all, they no longer see a reserve fund which they had formerly built up at some sacrifice. Their financial reserve in many instances has gone. The Savings accounts in the banks show this. Winter is coming on, with fuel to buy and with store bills overdue.

Paid agitators cost the workmen of Cobalt close to half a million dollars. For this the workers gained nothing. The agitators did not suffer, their salary going on during the progress of the strike. The pity Cobalt Miners' Union cannot read English and cannot see these facts recorded. They are "fed-up" with phrases coined for their consumption by the agitators, and are blinded to the folly of the way into which they are being led. It is among the illiterate that the erstwhile alleged leader Jimmy McGuire found his chief support and which element will in the future constitute the last shreds of the remnant of Western Federationism in this country. The educated worker has re-awakened and will probably no longer lend his support to that organization.

Some credit is due to James Lord, representative of the Mining Department of the American Federation of Labor. But for the visit of Mr. Lord it is probable that the radicals would have held sway for some time longer. However, perhaps no one recognized the futility of the effort and the unjust cause of the Cobalt Miner's Union better than did Mr. Lord He at once appeared to see that recognition can never be won by the Western Federation of Labor. He could not help but see that wages and conditions were all that could be expected. It was his visit coming just at a time when the Cobalt Citizens' Committee took up the question with the men that caused the vicious attempts of the radicals to collapse. In the light of these events McGuire representing the W. F. M. stands condemned as a failure, and the executive of the Cobalt Miners' Union wins a just reward for its utter incompetency.

Cobalt Situation May Re-Act at Kirkland Lake.

There is considerable speculation in Kirkland Lake with regard to what the future action of the Kirkland Lake Miners' Union will be now that the labor strike at Cobalt has terminated. It is generally conceded that the strike at Kirkland Lake was brought on unnecessarily and involved an aggregate of mines which were the least able to bear up under increased demands. Furthermore, the mine managers sent the full limit and met their employees in open conference, yet in spite of frank discussion the Union declared the strike on June 12th.

After making careful inquiry concerning the present situation, the writer has learned that the directors are a unit in supporting the management at the leading mines in their present stand. Also, according to official advice, the majority of the directors have long since been of the opinion that money would be saved by remaining closed until the spring or summer of 1920. In spite of this, however, it is believed that if the workers of Kirkland Lake would follow the lead set by the workers at Cobalt and at a representative meeting decide to return to work on the old conditions, a number of the companies might be found to make a new beginning this fall. However, even this would be very difficult on account of a shortage of coal, etc., and with cold weather not far off. It is the consensus of opinion that unless a beginning is made within the next thirty days there would be exceedingly small hope of any extensive operations being attempted until the winter passes.

The time seems to have arrived when the business men of Kirkland lake might make an organized attempt to induce the men to gather in conference, and, in view of the termination of the Cobalt strike, and harmonious conditions in Porcupine, discuss the entire situation afresh and reconsider the present difficult task of waging a long contest.

Larder Lake, Ont.

Associated Goldfields.—Outside of the producing mines of this district, perhaps no other property in the development stage is attracting greater interest than is the Associated Goldfields, of Larder Lake. Conservative mining men have been inclined to criticise the enterprise adversely, chiefly for the reason that favorable "reports" appear to be almost unlimited, while essential information on which to intelligently weigh the merits or demerits of the property are almost entirely lacking.

The Associated Goldfields Company has adopted a method of financing which appears to be at once unique and at the same time effective. "Missionary" work is carried on systematically at points where there appears to be a likelihood of fair number of speculators. Those found sufficiently interested in the proposition are gathered into groups and taken north by special car to see the property. At times these special car excursions are almost weekly occurrences. The visitors, it is understood, are each required to pay his or her share of the cost of the special car. The visitors are shown over the property. They are permitted to see with their own eyes spectacular showings of native gold. They are told about the great plans for the future, the building of one of the greatest reducing plants in the country, etc., and they leave convinced that the Associated Goldfields is indeed destined to become a world-famous gold mine. "What do we care for the opinion of mining engineers?" they have been heard to declare, "can we not see the gold for ourselves!" Thus, laboring under the delusion that visible native gold in spectacular patches constitutes a gold mine, they return south and purchase shares. As a result of this the company is now "reported" to have upwards of half a million dollars in its treasury.

So far as the public is concerned there is no detailed assay sheet in existance which shows the average grade of the ore as developed to date. The alleged ore bodies for all any man appears to know may prove to actually be turned to profitable account or may prove to be so many millions of tons of waste rock. Here it is that an exceedingly important point arises, which is this: If the property actually contains large deposits of low-grade, but nevertheless, commercial ore, then it would be a great pity to hinder the promoters in their effort to secure funds with which to carry on the proposed development work. On the other hand, in view of the fact that the opinion of leading engineers of this country has not been sought and no report issued along the usually recognized lines, serious doubt arises, and, in the opinion of the writer and in all sincerity the purchaser of shares in the Associated Goldfields takes one of the wildest gambles imaginable.

Up to the present not far under one million dollars

has been spent on the property, or, at least, not far under a million dollars has been spent by the company. In recent months the proposition has been referred to in this country as the North's "mystery" mine. This appellation is coined from the fact of the mystery as to where the money has been spent and the mystery concerning what has been developed.

It can therefore be seen that whether or not the property of the Associated Goldfields will ultimately develop into a profitable mining proposition cannot be intelligently estimated at this time. The absence of essential information appears to be ample reason for discouraging the public from risking finances in the enterprise.

One contention heard in the North concerning the company is that if the property is all that it is claimed to be, then it would only remain for the company to engage a leading mining engineer with proven and recognized ability in this country and present a report to the public. If such great things are in store as gossip would tend to indicate, then stock in this company would not go begging for buyers at $1 per share. Neither would it be necessary for the Associated Goldfields to dispose of its shares subject to pool. It is generally recognized that this method of financing (that of selling shares which the purchaser is obliged to hold in person for a given time) is borne of the fear that to-day's purchaser may be tomorrow's seller, hence the restrictions.

The fact is that those connected with the company are spending broadcast rumors which cannot be definitely contradicted perhaps for the all-important fact that no definite knowledge is obtainable as to the amount and the average grade of the ore. Until such information is forthcoming in an authentic way it would perhaps be folly to class the proposition as anything else than a wild gamble to say the least. This, not for the reason that the writer knows it to be such, but for the reason that no evidence is forthcoming to prove that it is not.

In a report recently issued by the Ontario Bureau of Mines after referring to the geological conditions, P. E. Hopkins, geologist, says in part: "Although this association of rocks and mineral solutions is not known to form ore in many parts of the world, still there is resemblance to the ore bodies on the Rawhide mine, southeast of Angels Camp, Cal. Small, medium-grade ore shoots do occur, as on the 83-foot level of the Reddick, and 500-foot level of the Harris-Maxwell. But they are isolated with little to indicate where they will be found, and what will be their extent." Mr. Hopkins further states: "Since the known richer shoots are small and scattered, the success of mining will depend upon the mining of extremely large bodies of low-grade ore which will necessitate much capital and very detailed mining."

Therefore, if the success of mining is to depend upon the mining of low-grade ore the question is this: How much low-grade is there actually in sight and what is the average gold content per ton? Also, what will it cost to treat the ore, and upon what calculations are the estimates based? Companies which in the past have gone to the public with such a proposition have made it a practice to present a report in detail. This the Associated Goldfields has not done.

It would be wrong to conclude without making it clear that there is no desire on the writer's part to discredit the efforts of the promoters of the Associated Goldfields. Neither is it a pleasant task to advise the public to keep out of the proposition. But unless or until authentic statements can be secured, it would be rank folly to advise otherwise. This, whether or not the property ultimately develops into an important gold mine or turns out to be the wildest of Northern Ontario's wildcats.

Notes.

The operations of the Gold Nugget Products' Company, Limited, is attracting considerable interest. The property is situated in the township of Henwood, a short way south from the Elk Lake branch of the T. & N.O. Ry, and was discovered by A. T. Stone. The Gold Nugget Products Company was formed for the purpose of purchasing the property from Mr Stone and proceeding with the manufacture of various products. It is stated that the rock before manufacture is so hard it will cut glass, but when ground and treated by special process produces the very finest wet hand cleaner, dry hand cleaner, goldfish sand, cleanser for household use, poultry and bird grit, washing powder, course and fine pumice, etc.

An interesting display of the product was to be seen at this year's Canadian National Exhibition.

Harry Oakes, president of the Lake Shore mine, has returned to Toronto, after having paid a brief business visit to the north.

A. Ferland left this week for Texas where he will be the guest of David Fasken. Mr. Ferland expects to visit the oil fields in Texas during his three weeks' visit in the South.

According to current reports, the decision is expected very shortly concerning the boundary dispute between the O'Brien Mine and the Violet property of the La Rose Company.

DEATH OF INSPECTOR OF MINES A. H. BROWN.

The recent death of Mr. A. H. Brown, at Owen Sound, has caused considerable regret in the north country, particularly among the mining fraternity, where he was well known and respected. Deceased had an interesting career since his graduation from the University in 1899. Until 1903 he was assistant chemist and assayer at Deloro, Ont., also in charge of the bromo-cyanide plant. From 1903 till 1905 he had charge of the 40-stamp mill and cyanide mill and cyanide annex for the Daly Reduction Co., at Hedley, B.C. Following this he was prospecting in the Cobalt district for two years, and took two years preliminary work re-erection of cyanide plants. He superintended the installation of an experimental plant to treat arsenical gold ore for the Canadian Exploration Co. at Naughton, Ont. From July to December, 1911, he was manager of the Pike Lake mines, Swastika, and in 1912 accepted the position of manager of the Hudson Bay mines. From January, 1914, to April, 1916, he was manager of the Dome Lake Mining and Milling Co., South Porcupine, and in 1917 was manager of the Green Meehan mine. He has been connected with the Department of Lands, Forests and Mines since the beginning of the present year.—Cobalt Nugget.

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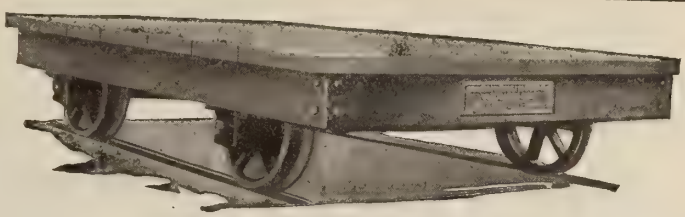

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PERSONALS.

Mr. Galen Stone, of Hayden Stone & Company, recently visited the Wabana iron-ore mines in company with Mr. D. H. McDougall of the Scotia Company.

Mr. C. E. Weed, manager of the Hancock Copper mine, Michigan, is in Toronto. He has just returned from a trip to Mexico and the South Western States.

Mr. Geo. R. Rogers was in Toronto for a few days after spending several weeks at the properties in the Wasapika gold area which are being developed under his direction. He has returned to Wasapika.

RECENT MINING INCORPORATIONS.

North Cliff Mines, Limited (No personal liability.) Incorporators: Mary Elizabeth Cherrier and Florence Gordon, stenographers; Edward Thomas Boland, company manager; John Francis Boland, barrister-at-law; and Charles Henry Bowyer, student-at-law— all of Toronto. Capital $100,000, divided into 100,000 shares of $1 each. Head office, Toronto.

Index Mining Company, Limited. (Non-personal liability.) Capital $200,000. Registered office, South Fork of Kaslo Creek.

Mineral Claims Development Company, Limited. (Non-personal liability.) Capital $1,000,000. Registered office, Vancouver.

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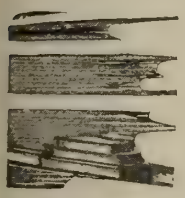

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:-: EDITORIAL :-:

A REAL MINISTER OF MINES.

This issue of the 'Journal' contains two photographs taken at the camp of the Big Missouri Mine, Salmon River, B. C. This promising silver property is owned by Sir Donald Mann and associates, and is now being developed extensively by diamond drilling. It will be noticed that snow is still lying on the ground although the pictures were taken in mid-Summer.

The photographs are of unusual interest inasmuch as they show the Hon. Wm. Sloan, Minister of Mines of British Columbia, dressed in the insignia and performing the proper duties of his office. British Columbia is evidently fortunate in having a minister who "ministers". The real significance of this word has become obscured, and in many instances the "minister" has conceived himself to be not the servant of his office, but the "boss" of all and sundry. We have no doubt that the mountain air and the exhilarating prospects that an inspection of British Columbian mining camps and prospects affords will benefit a Minister of Mines greatly, even if he hails from so salubrious a seat of government as Victoria, B. C., and that actual inspection of mines, combined with the personal acquaintance of the men who work them, will give any minister of Mines that intimate and sympathetic knowledge that is requisite for the proper discharge of his ministerial duties.

INSURANCE AGAINST MINE INUNDATION.

In a brief article in this issue of the "Journal" Mr. F. A. McLean calls attention to the insurance value of "pumps on hand."

The necessity for an adequate reserve of pumping capacity is particularly present in submarine mining, where the ability to control an outbreak of water may depend on whether it is found possible to check the flow in the first stages and before the inrush of water has so enlarged the original point of entrance as to make subsequent endeavours to check the flow of no avail.

In one well-known instance in Nova Scotia, where water entered from the sea, it transpired that the pump at the top of the slope, which limited the discharge by its own inadequate capacity, was the smallest of a relay of pumps extending to the bottom of the slope. The pump at the bottom of the slope was furnished with about six feet of "lodgment," and was of course quickly drowned out, and the water which came in was so little controlled by the pumping equipment available, that it was always remained uncertain whether the inbreak was uncontrollable or not. If it should prove from subsequent trial that the inbreak in question was a controllable one, it may be said with exact truth that the mine referred to was lost because of the lack of a reasonable reserve of pumping capacity, and because of the neglect to provide "lodgment" or water storage capacity sufficient to give the management time to erect dams. The whole of the assets of this mine were lost through the inundation. The invention of the centrifugal pump, combined with electrical drive, makes it possible to provide enormous pumping capacity that can be quickly transferred to the place where it is required, and the provision of such an equipment should be regarded as a necessary insurance against a contingency, which in submarine mining, is always possible.

THE FUNCTIONS OF THE GEOLOGIST.

The service of geologists employed by the federal and provincial governments are at the present time much in demand.

Large sums of money have been expended on the geological mapping of the still largely unknown mineral-beating rocks of Canada, and, considering the meagreness of the appropriations available for this purpose, and the pitifully inadequate salaries that the resources of the geological surveys afford to geologists, it must be conceded that the work accomplished has kept reasonably in the lead of the mining development of the mineral areas of Canada.

It may even be that the mining incorporations of Canada have come to depend too largely upon the assistance of the government geologists, and there seems to be an idea abroad that those men should jump from place to place according as importance may appear to attack, first to this place and then to that place, because of mineral discoveries.

Herein lies a certain amount of misconception as to the function of the geologists, and there is some danger of dissipating the energies of a body of scientific workers whose numbers are inadequate for the task before them.

The work of the geologist is above all a process of research, and it is a first requirement for successful research that it shall proceed slowly, being guided from discovery by the steady accumulation of ascertained facts.

A thorough absorbtion of the geological data appertaining to a given field is only possible by long acquaintance and uninterrupted investigation of that field, and it may take a very long time to absorb suffi-

cient information to enable a conscientious worker to commence constructive theorizing and justify him in announcing conclusions.

We distinguish here between the search for geological data and its recording, and the higher function of geological research.

Unfortunately the financial reward of the geological research worker is too often meagre, and always belated, a necessary consequence of the slow—but not necessarily leisurely—nature of research in any branch of human endeavour.

But, conversely, the reward of research is of infinite possibilities, and has been instanced in our times by very material gains.

Large consolidations of capital, controlling extensive mineral areas, because of the self-perpetuating nature of the legal incorporation, are in many respects possessed of greater stability and are less open to change than the departments of popular systems of government. Popular governments are not of necessity either democratic or of long continuance.

It is not surprising to know that some of the larger mining incorporations have realized the responsibilities that long tenure of title occasions, and have seen the advantages of continuous geological research concentrated on their properties, and have, for these reasons, added a competent geologist to their permanent staff. Such an official can in the case of large companies be offered a larger salary and more untrammelled opportunities for constructive study than is possible in universities and government positions.

From the operating standpoint the employment of a geologist by mining companies is advisable on many considerations, particularly to advise in regard to development work. To drive an expensive tunnel on the strength of a "hunch" is not a lucrative proceeding, but it has often been done, and there is still a large percentage of those who direct mine development who have not realised that mining is a science and not a gamble.

The indications which guide a geologist to his conclusions as to the places where mineral will be found, seem often to the uninitiated to have but the remotest connection with the object of his search, and indeed their connection may be most indirect. Nevertheless, if the geologist is left to his own direction—always presuming his competence— he will in due time far more than justify his appointment.

Many a shaft has been sunk in barren territory, and many a drift driven to no purpose that could have been saved had a geologist been asked for advice. But the reward that follows the casual employment of a consulting geologist is meagre compared to the advantages that would follow the life-long concentration of a competent geologist upon a selected property.

The rewards of research are always proportionate to the extent and concentration of effort, and while even occasional consultation with a geologist may yield gold fruit, it is a proceeding that does not allow him to demonstrate the true function of his profession or to realise the full extent of the insight derived from his science.

We believe the readers of the "Canadian Mining Journal" will be interested in Mr. J. C. Murray's review of an old book upon Cornwall, reprinted in this issue from the "Mining & Scientific Press." As the Editor of "M. & S. P." writes:

"Mr. Murray, formerly Editor of the "Canadian Mining Journal" is a writer well-known on both sides of the frontier that has no guns or fortifications."

The common heritage of the English-speaking peoples is evidenced by the fact that an ancient treatise dealing with Cornwall should be regarded of sufficient interest to United States' readers to be included in the columns of so discerning a periodical as that edited by Mr. Rickard, than whom no technical writer has done more to cement the bonds which a common origin, a common language, and identical ideals have occasioned between the two nations that live, one north and the other south, of the unfortified frontier to which Mr. Rickard felicitously refers.

Mr. Richard's further comment on Mr. Murray's article will find an echo on this side of the line. He writes:

> "In the antique phrasing and quaint spelling "of Richard Carew's volume the reader will find "many examples of archaic English, and he will "recognize some of the terms used by the Cousin "Jacks, who have played so useful a part in the "development, for example, of the Lake Superior "copper mines, of the gold mines of Gilpin county "in Colorado, and of Nevada county in California. "The gold that "they kept in quills" recalls the "use of 'pure quill' to express richness of ore; "we are reminded also of the fact that the pioneers "from Georgia who first prospected Cherry Creek, "near Denver, in 1849, put the gold they found "into quills made from the feathers of wild geese. "The Cornish cherished the fallacy, as old as "mining, that veins and lodes increase in size "and richness the deeper they are followed. They "did it out of a meagre experience; our modern "promoter does it in the face of a vast array of "contrary testimony. The reader will find many "delightful touches in the quotations given by "Mr. Murray and will join us in thanking him for "this pleasant diversion from the beaten ways."

THE NORTHERN MANITOBA MINERAL AREA NEEDS RAILWAY TRANSPORTATION.

The Manitoba Government has announced that if the Federal Government will not extend the railway from Le Pas the seventy miles necessary to reach the district north of Le Pas which is now showing so much promise of yielding valuable minerals, that the

Province of Manitoba would itself do this. This is real good talking, and Manitoba would have excellent precedent in the construction of the Temiskaming and Northern Ontario Railway by the Province of Ontario. True this railway was not originally designed to open up the Cobalt and Porcupine fields, but incidentally it did this.

The reports from Northern Manitoba are of a most encouraging character, and it is interesting to read in our British Columbia correspondence that recently a shipment of 1,923 tons of copper ore was delivered at Trail, B. C. from the Mandy Mine, near Schist Lake, Northern Manitoba. This ore is handled forty miles by team from the mine, then shipped 125 miles by boat and barge to Le Pas, and from there sent by rail to the Trail Smelter, being handled six or seven times in transit.

The presence of valuable minerals in the new district is now beyond question, and by the courtesy of Dr. Wallace, the Commissioner for Northern Manitoba, the "Journal" has on a number of occasions been able to give first-hand information on these occurrences.

If Manitoba desires to realize the full benefit of the Province's fairly recent acquisition of this northern country the construction of a railway would appear to be the first thing to undertake, and it may well be that enterprise of such a commendable character may be as richly rewarded as was Ontario's enterprise under like circumstances.

If the construction of an ordinary railway is not possible, why not look into the suggestion recently made in the "Journal" that a light railway—such as was used in France—should be built?

RICH COPPER ORE REPORTED FROM GREAT SLAVE DISTRICT.

It is reported from Edmonton that Major P. Bansall, M.C. of Ottawa, has recently returned from a prospecting trip to the Great Slave Lake district, where he has staked a copper claim, the ore of which assays 49.2 per cent copper, 2 ounces of silver, and a trace of nickel per ton. The claim is located twelve miles inland from navigation on the lake.

During the past four years the district had been carefully prospected by George Bruce, who, unfortunately, fell a victim to the "flu" at the Calgary Barracks last autumn, within a very few days after his return. He had brought samples of ore with him, and rough notes as to location. He was unable to make a detailed report before his death, and Major Bansall undertook to trace Mr. Bruce's course in this Northern area. The Major was fortunate in meeting with an Indian who had accompanied Mr. Bruce, and thus experienced little difficulty in locating the copper prospect.

This work from the beginning has been carried on by a small Edmonton syndicate, who are very optimistic about the mineral possibilities of the country lying to the north of Lake Athabasca, the general formation being the same as that of Porcupine, Cobalt, and Le Pas.

CANADIAN ENGINEERING STANDARDS ASSOCIATION.

At a meeting of the Main Committee of the Canadian Engineering Standard Association, held on September 8th, Mr. H. H. Vaughan in the Chair, the following new members were appointed:

Mr. J. M. R. Fairbairn, nominated by the Canadian Pacific Railway.

Mr. H. H. Kelley, nominated by the Grand Trunk Railway.

Mr. A. F. Stewart, nominated by the Canadian National Railways.

Mr. F. A. Gaby, nominated by the Hydro-Electric Commission of Ontario.

Mr. A. A. Dion, nominated by the Canadian Electrical Association, and

Mr. J. Stadler, nominated by the Canadian Pulp & Paper Association.

The lists of members for the following Sectional Committees were approved:

Electrical Sectional Committee:
Chairman: Dr. L. A. Herdt.

Sectional Committee on Steel Bridges and Construction
Chairman: Mr. G. H. Duggan.

Sectional Committee on Wire Rope:
Chairman: Professor H. M. Mackay.

Recommendations as to membership of the following Sub-Committees were received and the Committees appointed accordingly:

Sub-Committee on Steel Railway Bridges:
Chairman: Mr. P. B. Motley.

Sub-Committee of Incandescent Lamps:
Chairman: Mr. John Murphy.

Sub-Committee of Transformers:
Chairman: Mr. A. A. Dion.

The secretary reported the progress made with regard to various questions already under consideration, and further reported a number of requests for action on the part of the Association. Several of these were approved for further enquiry and report.

The Chairman then welcomed Mr. C. Le Maistre, the secretary of the British Engineering Standards Association, who is now on a visit to Canada and the United States. Mr. Le Maistre described briefly the work of the B.E.S.A. and drew the attention of the Committee to certain matters in which his Association would welcome the assistance and co-operation of the Canadian Engineering Standards Association, referring especially to proposals which have been made with a view of obtaining some degree of Anglo-American agreement as to screw thread standards. Mr. Le Maistre further pointed out the desirability of international agreement as to rules affecting electric appliances and fittings, particularly for interior use.

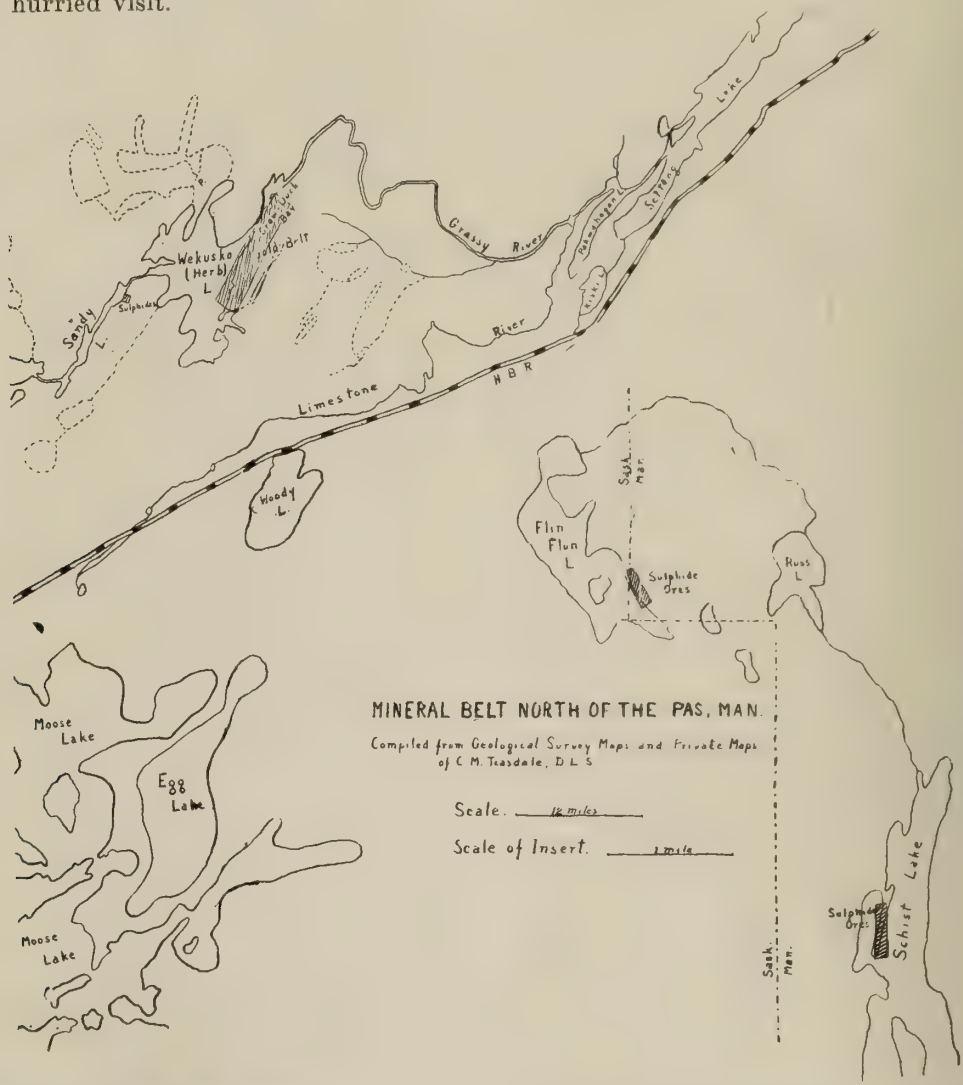
As regards the first suggestion, it was decided to appoint a Sub-Committee on Screw Threads, with instructions to consider and report on Mr. Le Maistre's communication.

Considerable discussion took place on the question of rules for electric appliances and the Committee agreed that the formulation of a Canadian Electric Code was most desirable. The Committee then directed that a Sub-Committee should be called together to enquire and report further as to this point.

Recent Developments in Manitoba

By Justin S. De Lury.*

The discovery of wonderfully rich gold ore in the vicinity of Copper Lake in Northern Manitoba by J. P. Gordon and his associates has aroused country-wide interest and has made that area the Mecca of prospectors and mining men during the past few weeks. The writer was fortunate in having a day or two to spend in the Copper Lake area and as few facts have been published in connection with the several discoveries in that vicinity, he believes that readers of the Journal may be interested in reading a few notes accumulated in a hurried visit.



Rich Ore At Copper Lake.

The discovery that was given widest publicity by the press of the country was that of a very rich pocket of native gold in quartz occurring in a quartz vein near the shore of Copper Lake on a claim held by J. P. Gordon. Gold to the reported value of several thousand dollars was taken from this pocket which outcropped on the surface. At the time of the writer's visit some rich ore was still to be seen at the bottom of a small pit from which the high-grade had been removed. Running each way from the pocket, the quartz vein is exposed for a length of about four hundred feet, having an average width of quartz in this length of about a foot and a half and of sheared rock and quartz of three or four feet. On an adjoining claim to the southwest is a vein which might be a continuation of the other vein, from which it is separated by overburdened rock. This vein is traceable for several hundred feet with an average width of about three feet of quartz. The quartz in these veins, or vein, if they are connected, shows the following sulphides in varying though usually small amount: pyrite, molybdenite, chalcopyrite and pyrrhotite. A mineral occurring in very small grains suggested native bismuth.

Large Deposits on Gordon and Peterson Properties.

What appears to be a more important discovery is a large quartz vein which outcrops on claims held by J. P. Gordon and associates and on others held by Carl Peterson. This vein lies to the north of the previously described vein. It strikes northeast and is nearly vertical with a steep dip to the northwest. The average width as judged from the best outcrops appears to be at least twenty feet. The length as determined from the strikes and outcrops will doubtless be two thousand feet and may be about two miles. The writer

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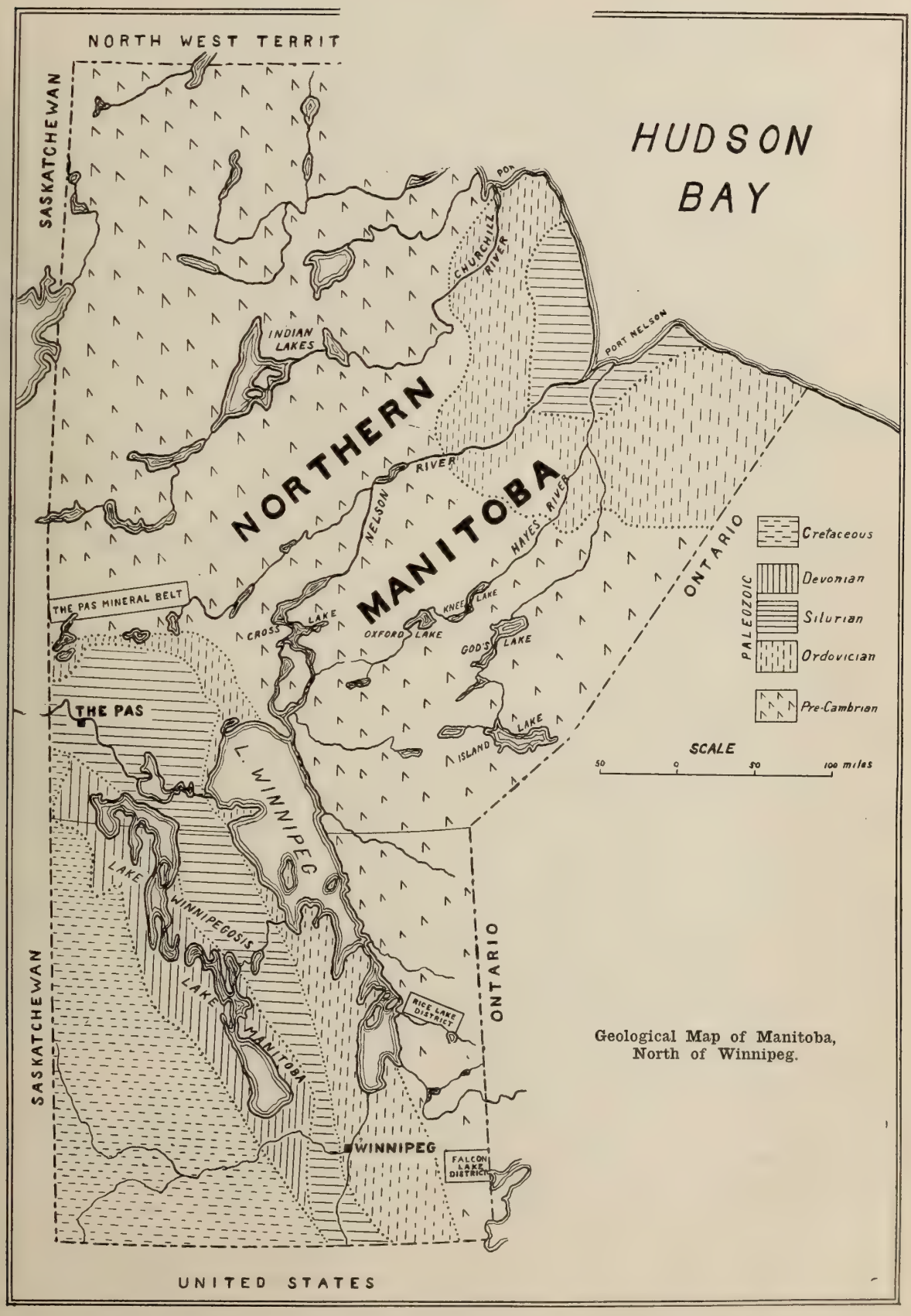


Geological Map of Manitoba, North of Winnipeg.

has no first-hand knowledge of the values contained in this vein, but he has information which is regarded as reliable that on the principal outcrop on one of Gordon's claims, six samples, taken by picking pieces with the idea of obtaining a fair value for the whole width of the vein, gave values between nine and fifteen dollars in gold and silver. If these values are confirmed by more careful sampling and if they continue for a reasonable length in the vein, there is no doubt as to the future of the Copper Lake area. On this outcrop the vein is made up principally of a peculiarly jointed quartz, with joint planes so smooth and regular that they suggest a mineral cleavage. The vein is slightly pegmatitic near the hanging wall; the other wall was not so well exposed but it will probably be of the same nature. Fine-grained molybdenite was noticed particularly near the pegmatitic wall. Pyrite, galena and chalcopyrite are seen in fine grains scattered apparently through all parts of the quartz.

On the Peterson outcrop the mineralization is much the same. No molybdenite was noticed and the sulphides are segregated into larger masses. Galena shows in a width of over fifteen feet of the vein in this place and is quite prominent in two or three feet. Chalcopyrite and pyrite are mixed in fairly large bunches in some parts of the vein. On the hanging wall here the vein material closely resembles some of the phases of the sulphide bodies, to be mentioned later, and indicates a transition to this type of deposit.

Other Deposits in Copper Lake Area.

Other deposits of mineral have been found in the Copper Lake area, but so far they have been investigated very little to determine their values. There are some large quartz veins only slightly mineralized; one of these with scarcely any sign of sulphides is said to have produced a rich but small pocket of free gold. Other quartz veins are found, some of them of considerable size and traceable for several hundred feet, and showing combinations of the following sulphides in varying actual and relative amounts: pyrite, galena, chalcopyrite and molybdenite. No doubt many of these veins will be found to carry values in gold and silver, but whether in workable amounts it is impossible to say.

In the vicinity of the southern part of Copper Lake and of Brunne Lake are found some deposits of sulphides. These vary in width; some of them are a few feet wide and consist of almost solid sulphides; others are several hundred feet wide and are made up of solid bands mixed with schist impregnated with sulphides. The prominent minerals are pyrite and pyrrhotite. A little chalcopyrite is to be seen in places. From the mineralization of the district it may be judged that some galena and possibly sphalerite will be found in small amount associated with the other sulphides. Nickel is another possibility. The great similarity of these bodies to deposits in the Hawk Lake District in southern Manitoba suggest the possible presence of tin and in general low values except in sulphur for the bodies.

Flin Flon.

Unusual interest is displayed in other portions of The Pas Mineral Belt. It is expected that arrangements will soon be concluded whereby work in the way of railroad building and smelter erecting will be initiated with a view to developing the Flin Flon sulphide ore bodies. If this work goes ahead, no doubt the Tonapah Mining Company will continue production from the Mandy Mine; at the present time this company is shipping the high-grade copper ore taken from the mine last year, by means of barges working on the Saskatchewan River.

Herb Lake.

In the Herb Lake District arrangements have been made that a Winnipeg company will continue sinking operations on the Northern Manitoba vein; the shaft is already down 125 feet. It is rumored that the Rex mine will soon be reopened. Deals are pending which should result in a thorough investigation of the Gasse property, a prospect with considerable merit.

Rice Lake.

Several of the older Rice Lake companies have reorganized and some new ones have been formed. Some of these companies are offering stock for sale in the Winnipeg market. The public is safe-guarded in Manitoba to the extent that over sixty percent of the money received from stock sales must be spent in actual development work.

On the whole it may be said that in the opinion of men best qualified to judge, Manitoba is about to experience greater activity in mineral development than has ever fallen to her lot in the past.

NOTES FROM THE PAS.

Pleased with it all, and charmed with Northerners, the Duke and Duchess of Devonshire departed on Monday, after three delightful days in The Pas as guests of the town and Northland.—The Pas Herald.

The mining engineers of Flin-Flon syndicate will arrive in The Pas en route to the mines on Thursday, Sept. 25, it is stated by officials of the company. The object of the visit is for the purpose of further examination and to make preliminary arrangements for opening up the property. Mr. Raymond Brooks, who was here in 1915-16 in connection with this mine, will be a member of the party.

C. W. Greenlees is running a large force of men on a claim situated on the northwest arm of Schist Lake. This claim was staked by David Collins, and he found a large body of sulphide. He disposed of his interest to H. J. Bickle, who subsequently optioned it to Mr. Greenlees. The ore taken out resembles the Mandy, and Mr. Greenlees is exploring more fully to determine the tonnage and values.

Hon. Edward Brown is reported as saying that, unless the Dominion government builds a railway to the mines, from The Pas, the Provincial one will do it. All papers in Canada have carried this announcement, which concludes a warning that the Dominion government must act quickly.

This is of the greatest interest to the northland, and the importance of having this railway built, and at once, cannot be too strongly emphasized. It is the opinion of the Herald that if the Provincial government wants to get in right with the mining people of Canada, they can do so, by giving the Dominion government time enough to reply to a wire, stating they will or will not proceed with this line to-day.

The Survey of Cornwall

By J. C. Murray.

There is both refreshment and profit in discovering for one's self the points of view of old writers on matters pertaining to mining. Mirth and edification walk hand in hand as one reads the pages of the volume whose title is displayed above.

Richard Carew, the author of "The Survey of Cornwall," was born in the year 1555, at "East-Antonie, in the eastern part of Cornwall, within some miles of Plymouth." As a youth such was his precocity that he became a gentleman commoner of Christ Church when but 11 years old. At 14 years of age he engaged in a public debate with the "matchless" Sir Philip Sidney. Concerning his subsequent career, there are but hazy accounts. What is certain is that he became an ardent observer of natural history.

In the year 1602, Carew published his "Survey of Cornwall," and dedicated it "to the Honorable Sir Walter Raleigh, Knight, Lord Warden of the Stannaries, Lieutenant General of Cornwall." His dedication is more than ordinarily ingenuous and naive. It commences:

"This mine ill-husbanded Survey, long since begun, a great while discontinued, lately reviewed, and now hastily finished, appealeth to your (Lordship's) direction, whether it should passe; to your correction, if it doe passe; and to your protection, when it is passed."

He prays that "each wel-minded Reader will wish a merrie passage, to this my rather fancie-sporting, than gaine-seeking voyage;" and, before getting down to real business, he indites a charming little "Prosopopeia" of five verses, one of which runs thus:

"I curry not with smoothing termes,
Ne yet rude threats I blaste:
I seeke no patrons for my faults,
I pleade no needless haste."

Herefrom could many an over-deprecatory author learn wisdom!

Nearly every page of the "Survey" is tempting. However, we must content ourselves with those touching on mines and mining.

A brief sketch of the topographical features of the "Duchy" closes with the remark that "in the rest of this earthy description, I will begin with such minerals as her bowels yeeld forth. . . . These minerals are not so deepe buried in the entrailes of the earth, nor so closely couched amongst the Rockes, but that desire of gaine with the instrument of Art can digge them up: they may be divided into stones and metals."

Quarry-stones, pebbles yielded by the "sea-strond," slate, and limestone are successively dealt with. As to copper, our author confesses to small knowledge and less curiosity; for he states that at one mine the ore was shipped to Wales to be refined, whether to save cost of fuel, or to conceal the profits, he does not care to venture a guess.

Silver is dismissed with the statement that although it is found, nature has not been lavish, for "what she proffereth with the one hand, shee seemeth to pull backe with the other."

The tin miners, Carew asserts, found "little hoppes of Gold" in their ore. These they kept in quills and sold to goldsmiths, but with little or no profit.

Diamonds, he declares, are found cleaving to the rocks in which tin is mined. "They are polished, squared, and pointed by nature," from which we may estimate Mr. Carew's acquaintance with crystallography.

On tin our worthy observer becomes eloquent: "But why seeke wee in corners for pettie commodities, when as the onely mynerall of Cornish Tynne openeth so large a field to the Countries benefit? this is in working so pliant, for sight so faire, and in use so necessarie, as thereby by the Inhabitants gaine wealth, the Merchants trafficke, and the whole Realme a reputation: and with such plentie thereof hath God stuffed the bowels of this little Angle, that . . . it overfloweth England, watereth Christendome, and is derived to a great part of the world besides." Thus delightfully does Carew ramble in dithy-rambic prose.

Amongst other things, we are told of the Cornish miner's belief that Noah's flood, moving from east to west, on its course to the sea, produced by denudation all the alluvial tin. Stories of the discovery of tin veins ("loads") by means of dreams are repeated, though the author carefully refuses to guarantee their credibility.

Prospecting is described succintly, but picturesquely, in one paragraph. "Shoad," the drift "shed from the maine Load, and made somewhat smooth and round, by the waters washing and wearing" is sought for by casting up trenches five or six feet deep and three or four wide. Rivers are turned from their courses, a practice to be condemned as being "little beneficiall to the owners of the soyle" since the low grounds have "herethrough their wrong side turned outwards."

Prospecting to find the "loadworkes" begins by "coniecturing by the sight of the ground which way the flood came that brought it thither, and so give a gesse at the place whence it was broken off." At that place a shaft five or six feet by two or three feet is sunk to a depth of seven or eight "to prove whether they may so meete with the Load" . . . "But," advises the cautious Carew, "you may not conceive that every liklyhood doth ever prove a certaintie: For divers have been hindered through bestowing charges in seeking, and not finding, and many undone in finding and not speeding, whiles a fair show, tempting them to much cost, hath, in the end, fayled in substance, and made the adventurers Banckrupt of their hope and purse." A fair epitome, this, of the whole matter.

Carew speculates engagingly as to whether or not tin minerals grow in the rock. He discreetly leaves the question open after quoting authorities pro and con. A rich tin vein is described as one that "carrieth a foote and a halfe in breadth, and is not overbarren." a definition worthy of the most non-committal geologist of today. To work such a vein, the discoverer, unless his purse is "lined beyond ordinarie," associates himself with some more partners, who are either practical "tinners" or else adventurers willing to contribute money. The laborers, be it noted, worked for eight pence per day, or, if paid by the year, for from four to six pounds, out of which wages they paid their own keep.

Should the new mine assume respectable proportions it was duly christened and a mine overseer, or captain, appointed. In most places, according to Carew, the

toil was so extreme that a shift lasted only four hours, no miner working more than the one shift. "The residue of the time they wear out at Coytes (quoits), Kayles, or like idle exercises. Their Kalinder also alloweth them more Holy-dayes than are warranted by the Church, our lawes, or their own profit." Carew had first-hand experience of the Cornishman's passion for pastimes, some of them so strenuous as to result in serious wounds and even in deaths. Farther on in the "Survey," in discussing the rough game of "Hurling to the Countrie," he remarks that the players retired home as from a pitched battle. Yet there was always evident the sporting spirit. "All is good play, & never Attourney (lawyer) nor Crowner (coroner) troubled for the matter."

To proceed with mining, however. The manner of working was "to follow the Load as it lieth, either side-long, or downe-right."

But here our friend Carew falls into heterodoxy by asserting that "both waies the deeper they sincke the greater they find the Load." Alluding to open stopes, he states that "from some of their bottomes you shall at noone dayes discrie the Starres." The miners were let down and hoisted up in a "stirrup" by two men on a windlass. Shaft-sinking and drifting and the problems of ventilation are mentioned. Sympathy is expressed for the poor miners who meet death through falls of rock. Foul air and mine-gases are thus touched on. "While they (the miners) thus play Mouldwarps, unsavorie Damps doe here and there distemper their heads, though not with so much daunger in the consequence, as annoyance for the present." Sometimes the rock was so hard that a good workman could "hew" only three feet in as many weeks. Pumping was effected by man-power, horse-power, and water-wheels where drainage could not be had by means of "addits" (or "audits"). Carew marvels greatly at the engineering skill of "otherwise thicke clouded braines" in driving these "audits."

He is also wonder-stricken that the operators should be "anyway able to acquite the cost" of the subsequent dressing, breaking, and stamping of the ore. The stamping-mill of the day, which the ore was conveyed either "in waynes or on horses' backs," consisted essentially of "three, and in some cases sixe, great logges of timber, bound at the ends with yron, and lifted up and down by a wheele, driven by the water." From the stamping-mill the ore passed to the "crazing" mill, where it was fed between two grinding-stones (actuated by water or man-power) and there "brused" (bruised) to a fine sand.

But innovations were already creeping in. "Of late times," the author remarks, "they mostly use wet stampers, and so have no need of the crazing mills for their best stuffe, but only for the crust of their tayles."

The process of concentration was carried on by means of riffling the crushings over green turfs, three or four feet square and one foot thick. The concentrate was put into a wooden dish, broad, flat, and round, "being about two foote over, and having two handles fastened at the sides, by which they softly shogge the same to and fro in the water betweene their legges, as they sit over it, until whatsoever of the earthie substance that was yet left, be flitted away." But mark again the march of progress. "Some of later time, with a sleighter invention, and lighter labour, doe cause certaine boyes to stir it up and downe with their feete, which worketh the same effect."

Each partner in the venture then carried his portion to the "blowing house," where it was melted and cast into "peeces of a long and thicke squareness, from three hundred to foure hundred pound weight, at which time the owners mark is set thereupon." Once again Carew marvels wherein can lie the profit in going to such extraordinary pains—two or three months of extreme and increasing labor, numberless dangers and vicissitudes, and, last, but not in his opinion least, the "tynners" ugly countenances, tanned "with smoake, and besmeared with sweate."

The melting was done in lightly constructed thatched buildings. Once in seven or eight years these were burned down to recover the mechanically lost tin.

After reference to "coynage," the account concludes with allusion to the bargaining between metal-buyers and sellers. The former brought long tales of bad markets, idle stocks, dangers of piracy by sea, rumors of war, and so on, in their efforts to depress prices. "The owner, on the other side, stoppeth his eares against these charmes," and grows eloquent on the scarcity of tin and the waxing expense of winning it.

It is impossible to reproduce the charm of Carew's volume. Part of it lies in the quaint and uncertain spelling, part in the diction, which is tinged throughout with Cornish idiom despite the author's Oxford erudition. But mostly it consists in remarkable keenness of observation and frankness of expression, together with a gift for moralizing that is typical of the spacious times in which Richard Carew, Esquire, of Antonie, in the Duchy of Cornwall, lived, moved, and had his being.—Mining and Scientific Press.

In the case of Wellington Colliery vs Pacific Coast Coal Mines, Limited, in which the plaintiff company sought damages for trespass, alleging that the defendant company some years ago had gone on their property and extracted a considerable tonnage of coal, the Appeal Court of British Columbia has handed down judgment in favor of the Pacific Coast Coal Mines, Ltd, This reverses the decision of the Supreme Court Judge, who found that trespass had been committed and that the Wellington Colliery Company was entitled to substantial recompense. Chief Justice J. A. MacDonald, of the Court of Appeal, puts his judgment in few words which, in part, follow: "The question is purely one of fact, and when we have the evidence of two witnesses, whose credibility is not called in question by the learned trial judge, and who are men of standing in their respective callings, who give explicit evidence that the respondents' late manager consented to the acts complained of, his authority to do so not being questioned, and when that evidence stands uncontradicted by any other witness and is not rebutted by any other fact or document put in evidence, there can, in my opinion, be no doubt as to the course which I ought to pursue. I must either accept the evidence of these two witnesses or in effect declare that they have been guilty of perjury. In the circumstances of the case there is no reason for mistake. The consent was either given, as these witnesses have deposed to, or their evidence is false to their knowledge. We were asked to draw certain inferences in rebuttal of their evidence from what took place at an interview between Michener and Fleming, but such inferences are not necessary ones and cannot, in my opinion, prevail against the positive sworn testimony."

Showing camp at Big Missouri Mine, Salmon River, with Hon. Wm. Sloan, Minister of Mines of British Columbia, in the foreground. This was taken during Mr. Sloan's July, 1919, tour of the northern mineral districts of the Province, which now are attracting considerable attention.

General view of the camp, back of which is the property, which is owned by Sir Donald Mann and associates and now is being developed extensively by means of diamond drill. The Big Missouri is expected, by those interested in it, to have as great a future as a silver producer as the Premier, which already is widely known among mining men as one of the most promising prospects of the Canadian West. It will be noted that snow still is present, although the pictures were taken in midsummer.

The Steam Pump as a Factor in the Development and Operations of Mining Properties

By F. A. McLean.

Few people to-day realize to what a large extent improvements in mining practice have been dependent on the development of the steam pump nor the importance of the influence which the invention of the latter has exerted on the evolution of the steam engine.

Before the advent of the steam pump, water was removed from mines by means of buckets or antiquated wooden sucker or pitcher pumps, and it is a significant fact that all of the earliest workings in England, in China and other parts of the Orient, as well as in the United States, and Canada, were abandoned as soon as water was encountered in larger quantities than could be successfully handled by these methods.

The history of modern mining methods dates back only to the invention of the steam pump, the evolution of which has not only made extensive mining operations possible but has been indirectly responsible for the invention and wide application of the percussive rock drill for with this invention was inaugurated a new phase of civilization very aptly termed "The Age of Steam."

The invention was of such importance mechanically that it is doubtful if the steam engine would ever have been perfected were it not for the incessant demands for some form of prime mover, made necessary by the rapid expansion of the extractive industries which followed the inception of the steam pump. In its earliest forms the steam engine was little more than an adaptation of the mine steam pump and not always a successful one at that. From this point the improvement of the one has kept pace with the other till at the present day the modern steam engine and pump are a far cry from the crude form of mine pump from which they sprang.

Mining progress is still dependent on the pump, not because the development of the latter has not kept pace with the former, but because pumping equipment is not used as often or as much as it should be. Many mine officials through a mistaken desire to keep down operating expenses try to get along without a pump, or else endeavor to use an old or broken down one until they have wasted several times the cost of a good pump, which they usually have to buy in the end.

Time is generally a very important factor in mining and losses in this respect are usually of more importance than they would be in other directions. Construction of new mining plants is as a rule so planned that the completion of one part follows another in logical order and if portions of the plant are built and then forced to remain idle while waiting for some piece of equipment, an unnecessary loss is the result.

Sometimes a mine is forced to operate at only one-half or one-third of its normal tonnage while awaiting the pumping out of some shaft or drift which has been flooded or drowned out. In the case of newly opened mines, a railway siding may remain idle, or an expensive boiler and engine or compressor plant is shut down, or operated at a very small part of its capacity, because some portion of the development is under water.

With the many forms of portable electric, gasoline, and pneumatic pumping outfits for temporary use, as well as the improved forms of gasoline, electric, steam engine or steam turbine driven centrifugal pumps for permanent installations now on the market, there is no necessity for the protracted delays which characterized the early years of mining history. There is no reason at the present time for a mine manager to say, this shaft will be sunk or this tunnel driven in so many days if we don't strike water. Portable pumps guard against such contingencies and impart a degree of assurance and certainty to the work which could not be felt in the past. It is, of course, necessary to have the pumps at hand ready to be called forth at a moment's notice in case of emergencies.

The successful mine superintendent or manager looks ahead, and realizing the difficulties before him, takes the proper precautions to overcome them or turn them aside, while the unsuccessful one either fails entirely to look ahead or when he has done so, does not make any allowance for contingencies.

Nowhere is this fact more true than in the purchase of mine pumping equipment. Many mine superintendents, either through forgetfulness or indifference, do not place an order for their pumps of small size until they are actually badly in need of them, and then have to wait for their purchasing agents to secure them through the usual channels with all the accompanying delays and red tape.

In most cases the pumps should be ordered far enough ahead so as to arrive at the mine as soon as the timbers, whether the opening is to be a shaft, slope, or tunnel. The probabilities are that in any event water will be struck within a few days and it must be expected eventually. With the pumping equipment on hand a reasonably economical removal of the water, and a steady progress with the work is assured. Large mines will find it to their advantage to keep a number of small pumps on hand, as the capital invested in them need not be large and when properly stored they will not deteriorate. The money invested in this way may be regarded as the premium on an insurance policy that guarantees as nearly as possible against the interruption of operations through water troubles. Few of us object to paying a premium on life or fire insurance. Why should we not regard "pumps on hand" in the same light?

With the labor strike over and reasonable prospects of harmonious condition for considerable time to come, and with commercial bar silver quoted at the highest average in the camp's history, double incentive is offered for the exploration of some of the old but promising Cobalt properties which have lain idle for the past several years. This, in addition to the aggressive development of the producing mines.

Among the probable new operations will be the Farah property now owned by the Nipissing Extension Company. Also, it is understood, the old Hylands property will be opened up.

On the Hylands a thick layer of keewatin formation overlies the diabase and the geological conditions appear to be favorable. The property lies north of the Ophir.

CANADIAN COAL MEN.

The Canadian Mining Institute recently appointed a Special Committee to consider the formation of a Coal Mining Section, and on this Committee, Mr. Thomas Graham, the subject of our sketch, was named, which, we take it, is sufficient evidence of his right to be classed among the representative coal men of Canada.

Mr. Graham was born in Ayrshire, Scotland, on Christmas Day, 1867, and we should imagine has proved not a bad Christmas gift to his folks. He received, like so many of his countrymen who have succeeded abroad, a common school education, a privilege which Scotland affords to her sons of a character, which it is no disparagement of native ability to say, accounts largely for the dominance of Scotchmen in mercantile pursuits abroad.

Mr. Graham came to Canada in 1888, and worked as a miner in Lethbridge, Alta., until 1893. The next nine years were spent in Montana, Wyoming and Colorado. After a short return to Canada occupied as foreman at No. 2 mine of the Crows Nest Pass Company, Mr. Graham became superintendent of the Skagit Coal & Coke Co. at Cokedale, Wash. In 1904 he returned to Canada as Superintendent of the Western Fuel Company at Nanaimo, B.C., and continued in this position until the end of 1911, when he was appointed Chief Inspector of coal and metalliferous mines in British Columbia. This position he resigned in April, 1917, to accept the position of General Superintendent of the Canadian Collieries (Dunsmuir) Limited, which he now holds.

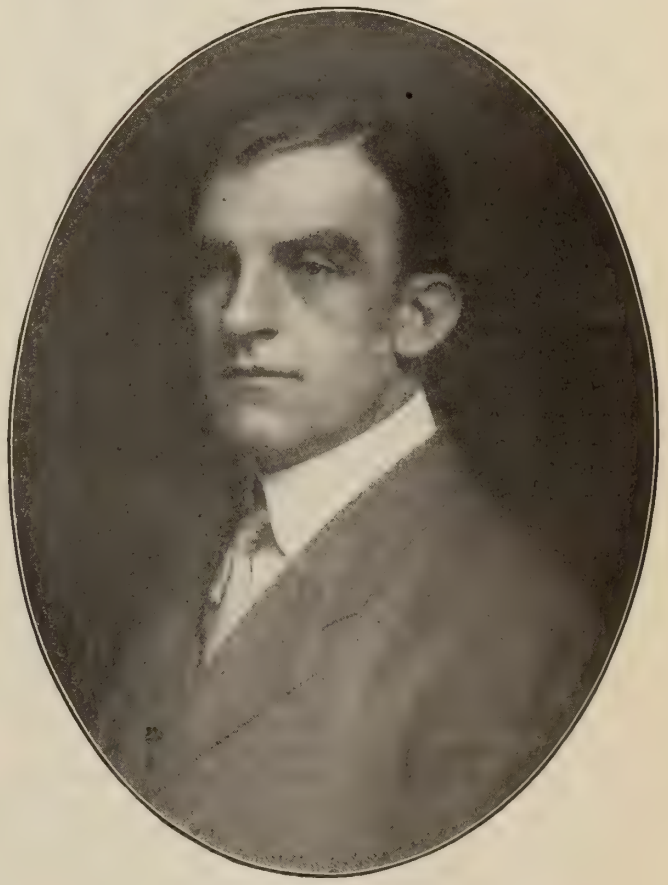
THOMAS GRAHAM,
Gen'l Supt. Canadian Collieries (Dunsmuir), Ltd.

Mr. Graham's connection with the Canadian Mining Institute dates back to his election as a member in 1908. He was Chairman of the Western Branch of the C.M.I. in 1916. He was elected President of the Mine Inspectors' Institute of the United States in 1916, holding over the two years the United States was in the war, and still holds this office.

PIONEER MINE ENGINEER JOINS GREAT MAJORITY.

Charles McConnell, a native of California, and a foremost mining engineer of the gold and silver camps of the North, is dead. He vied with Manager McCluskey, of the McKinley-Darragh Mine, as to which was the longest in the camp. No one disputed their claims as to being the pioneers.

Mr. McConnell had been a big man for the North and a big man for the financial and speculating people of the United States. Not only was he connected with the development of many valuable properties, but he made hundreds of trips to New York to interest investors in properties and succeeded in bringing much American capital to the North. He had a big New York connection.



CHARLES McCONNELL.

In 1905 Mr. McConnell was connected with the Hargraves Mine. Later he was with the Red Rock, then the Trethewey, the Walkman, Touch Oakes' Gold Mine and up to the time it fell prey to the bush fires this Spring, he managed the Patricia at Boston Creek.

His wife was a daughter of Senator Clemow, Ottawa, and she, with three children, survive.

Special Correspondence

BRITISH COLUMBIA.

The Collieries.

Coal Selling Prices Advanced:

Coal continues to advance in price in British Columbia, the quotation per ton to the consumer now being $11.50 a ton, as compared with the $6.50 asked before the war. The explanation, of course, is the high cost of production, although there is a disposition in some quarters to doubt whether the value placed on the fuel is justified. The jump from $6.50 to $11.50 did not come at once without notice. The process has been more or less gradual. During the war there was an investigation into production costs authorized by the Dominion Fuel Controller and, as a result, the price of coal at the bunkers of the various companies was fixed. Since the first of the present year the coal miners have received increases to their wages. Those employed by the Canadian Collieries (D) Ltd., the Pacific Coast Coal Mines, the Nanoose Collieries, and other companies, with the exception of the Canadian Western Fuel Co., have had their pay raised at intervals in proportion to the increase in the cost of the necessities of life. The extent of the additions to their pay envelopes is shown by the following table:

Date of Increase	Amount per day.
February 1st, 1919	2¾c
May 1st	2½c
August 1st	15 c
Total	20¼c

The men of the Canadian Western Fuel Company did not come within the general arrangement which brought to the employed of the other companies these increases. Recently, however, their representatives waited on the management and pointed out that their wages were not sufficient to meet the demands of the day on the purse of the householder. After some negotiation the company, recognizing the position in which the men were placed, agreed to advance the men's pay all round to the extent of 25c a day, and the same went into effect on the 1st of September.

With the increase in the miner's pay the companies, as was expected, there were some changes in the price of domestic coal at the bunkers and, to make the cycle complete, advances were recorded, almost simultaneously, by the retailers. On April 1st last the latter announced an increase of 50 cents a ton; on June 29th there was added another 50 cents; and on September 1st there was a further addition of 75 cents. Thus, since the beginning of the year, the retail price of domestic coal in this province has climbed $1.75 a ton.

While it is not expected that there will be any shortage of coal in the Pacific Northwest this winter it is a noteworthy fact that the miners have not been working full time during the summer. Owing to slack trade the Reserve Mine was closed down on the 30th of May, previous to which time the mines of the Canadian Western Fuel Company had been operating only four days a week. With the Reserve inactive it was thought that the other mines could be kept producing to capacity but this did not prove so evidently, as the other mines thereafter were worked an average of only 18 days a month.

All the Island Mines, as a matter of fact, have been working short time since the month of April and a careful computation of the loss in output from that month to the present date because of slack trade shows that it reached the substantial total of 192,807 tons. In this connection Hon. Wm. Sloan, Minister of Mines, has had prepared the following statistical table indicating how this loss was distributed among the various operating companies:

A detailed statement of days worked by different mines on the Island and estimated loss of tonnage through there being no demand, is herewith submitted up to the 31st of August, 1919.

Canadian Western Fuel Company.

	Days.	Loss in Tonnage.
Loss of time by mines in March	3	7,566
" " " April	4	10,449
" " " May	8	21,336

Reserve Mine Closed Down.

	Days.	Loss in Tonnage.
Loss of time other mines June	9	20,664
" " " " July	8	19,376
" " " " August	1½	3,057
	33½	
Reserve mine closed down June, July, Aug.	77	29,800
Total loss in tonnage through slack trade		112,239

Canadian Collieries, Extension Mines.

	Days.	Loss in Tonnage.
Loss of time by mines in April	2	1,610
" " " May	3	2,616
" " " June	6	4,782
" " " July	4	3,220
" " " Aug.	3	2,346
Total	18	14,574

Comox Mines.

	Days.	Loss in Tonnage.
Loss of time by mines in April	5	12,150
" " " June	2	3,074
" " " July	6	12,534
" " " Aug.	8	15,688
Total	21	43,446

South Wellington Mines.

	Days.	Loss in Tonnage.
Loss of time by mines in May	3	1,014
" " " June	2	444
" " " July	10	4,350
" " " Aug.	3½	1,152
Total	18½	6,960

Pacific Coast Coal Mines, South Wellington.

	Days.	Loss in Tonnage.
Loss of time by mines in March	2	440
" " " May	6	1,848
" " " June	8	2,592
" " " July	8	1,864
" " " Aug.	1	271
Total	25	7,015

British Columbia Coal Mining Company.

	Days.	Loss in Tonnage.
Loss of time by mines in Feb.	2	248
" " " March	1	111
" " " April	6	600
" " " May	7	546
" " " June	1	141
Total	17	1,646

Nanoose Collieries.

	Days.	Loss in Tonnage.
Loss of time by mines in Feb.	19	1,900
" " " March	10	1,180
" " " April	23	1,035
" " " May	20	1,320
" " " June	9	792
" " " July	7	700
Total	88	6,927

By Vancouver Island Mines.

Total loss of output through slack trade during 1919 equals 192,807 tons.

New Coal Developments:

A promising coal property situated about two miles west of Midway, B.C., and owned by the Boundary Mining & Exploration Company, which has been idle during the war, is likely to be developed. At a recent meeting of the shareholders of the Company, held at Cranbrook, B.C., a debenture issue was authorized to provide the funds necessary and it is expected that a substantial proportion of the same will be taken up by the shareholders. James Finch, of Medicine Hat, Alberta and E. B. Sawyer, of Spokane, were elected president and vice-president of the company. The property to which attention is to be directed has been developed to the extent that a seam having a general width of from four to eight feet has been exposed. Two tunnels have been driven, one 400 and the other 200 feet.

A considerable investment of capital in the development of Vancouver Island coal lands, situated in the vicinity of Nanaimo, B. C., is promised by Frank Carrel, proprietor of the "Quebec Daily Telegraph," who with other Eastern Canadians, is interested in these properties. Mr. Carrel returned a short time ago after making a trip to the Canadian West.

The Metal Mines.

Nelson, B.C.—On the property of the Electric Point Mining Company, which is situated south of the international boundary near Waneta, a new chimney of ore has been uncovered on which development is proceeding. Located on Gladstone mountain, about 12 miles from its shipping point, the Electric Point has a carbonate and sulphide ore, practically free of zinc and containing little silver. It occurs in large chimneys, 40 to 48 feet in diameter. The mine has been developed for the past four or five years almost exclusively by sinking with cross-cuts to connect the shafts, the depth of 800 feet being attained. The same lead ore belt is being developed on the Canadian side, where Messrs. Waldbeser & Reeves have opened a large low-grade vein on the low divide between the lower Salmon River and the Pend d'Oreille.

With further reference to the Eureka Mine it is announced by H. H. Vincent, president of the Vincent Development Company, which is handling the development of the combined Eureka-Granite-Poorman property for the Inland Mining Company, that the surveying of the 6,000 ft. extension of the tramway has been completed and that a contract for its construction will be awarded immediately. Mr. Vincent has inspected the work at the mines recently and reports that a car of concentrates is ready for shipment to the Trial Smelter. He says that it is much cleaner and better than that shipped in the month of August, owing to the tuning up of the Granite-Poorman Mill and to other improvements effected in the interval.

Merritt, B.C.

A systematic sampling of the iron ores of this district has been in progress recently with results which are described as satisfactory. Specimens were taken from Iron Mountain, the Titanic Group, the Porter Claims and from the Nicola District. While the assay returns are not all to hand those available run between 48 and 66 per cent hematite iron. Interested parties believe that this supply will solve the problem of the treatment of the large known deposits of magnetite of the Pacific Northwest by means of the blast furnace. On the other hand the extension deposits of limonite in the Bridge River District, carrying an exceedingly small percentage of objectionable impurities, is thought to assure a better flux for this purpose by others. W. M. Brewer, Government Mining Engineer, and a number of other experts, inspected the latter property this summer. Their reports have not yet been seen but from what can be gathered this limonite is deemed to be the ideal material for use with the magnetites of British Columbia in ordinary smelting practice. If this is so it would appear that the problem of the treatment of the magnetite referred to, a problem which has been concerning the Provincial Government and mining engineers for years and which led the former not long ago to obtain a report from Dr. Alfred Stansfield on the practicability of the treatment of these ores economically by means of the electric furnace, has been solved. However, until the new deposits are better known and have been proved up all that may be said on this point, after all, is speculation. This much, however, may be added: that capital is looking to the Canadian West with the idea of establishing an iron and steel industry and with the uncertainty as to fluxes for the magnetites which are known to exist in large quantity set at rest it is possible that the industry so much sought may become a realized fact before long.

Vancouver, B.C.

A representative collection of the ores of British Columbia was shown at the Vancouver Exhibition, which took place from the 8th to the 13th of September inclusive. There were attractive samples of silver, gold, copper, zinc, magnetite, wolframite, scheelite, cinnibar, bismuth, molybdenite, etc. displayed, the whole having been assembled under the supervision of the British Columbia Chamber of Mines. The exhibit from the Kootenays prepared by Fred A. Starkey, of Nelson, B.C., was one of the most prominent. It was a first-class index of the mineral wealth of that section of the Province. The lode properties of Sheep Creek, which are being extensively developed at present, were represented by specimens which attracted much attention. There were special exhibits also from the Surf Inlet Mines, the Dolly Varden Mines, the Britannia Mining Co.'s properties, the Granby Consolidated Mining & Smelting Co.'s mine at Anyox and elsewhere, the Canadian Consolidated Mining & Smelting Co.'s properties, the Drum Lummon, and the Bear River, Salmon River, and Portland Canal, gold silver, copper countries. The Skeena District and Gambier Island also were represented, as well as Alta Lake and Ypres, the two latter being on the line of the Pacific Great Eastern Ry. Another feature was samples of native and manufactured salts from the Basque Lake Deposits on the Thompson River near Ashcroft. Officials of the

Chamber of Mines, among whom may be mentioned specially W. Gray, the Secretary, as he had active personal charge of the exhibition, are to be commended for the satisfactory results of their efforts to prepare a display that would to some extent tell the story of British Columbia's mineral wealth. Prof. J. M. Turnbull, of the University of British Columbia, judged the samples.

Stewart, B.C.

Preston Locke, a mining engineer representing the American Smelting & Refining Co., Tacoma, Wash., recently visited the Portland Canal and Salmon River districts. Mr. Locke was favorably impressed with the development in progress. He said that the Remier and the Joker already were mines and there were many good prospects.

Great Activity in Northern Mines.

Just now there are many rumors of sensational developments in connection with the Big Missouri group of claims at the head of Portland Canal and 22 miles from Stewart, B.C.

A gold-silver ore body has been discovered on the Laura and E. Pluribus claims which has resulted in assays of from $50 a ton to over $600. One test showed $200 gold and 414 oz. of silver to the ton. There is also an immense amount of ore running $15 to the ton. Diamond drills are in operation, in some places being down 400 ft. and there is no sign of the ore body petering out.

Sir Donald Mann, who is now in Vancouver, holds the property under bond but refuses to say anything. It is said on good authority that he laughed at an offer of $2,500,000 for the property. Professor Bancroft of the McGill University, department of mines; Mr. Minard, a mining engineer of New York and E. Campbell, mining superintendent for the Granby Consolidated, are now inspecting the property. Some of the largest mining concerns have shown interest in the property and made offers for purchase.

It is believed that the Provincial Government has more information regarding this than has been made public as they are spending large sums in wharves, bridges and trails in this district. Supplies have been sent to the Missouri group from Vancouver the last few weeks and the number of men on the ground has been doubled.

Sir Donald is making his second trip north in eight weeks and mining men who have watched developments closely state that this is one of the finest gold and silver properties in the world.

Ore Exhibits At Vancouver Exhibition.

Mr. Lloyd Thomas, director of the Chamber of Mines and director of the Exhibition, were in charge of the British Columbia Chamber of Mines' exhibit at the Vancouver Exhibition, Sept. 8 to 13. They were assisted by Mr. K. Milne and Mr. H. W. Poole, returned soldiers, who are taking the assay course at the University of British Columbia. Their energetic efforts resulted in a splendid showing at the Exhibition this year. The display including every known grade of ore in British Columbia and many samples from outside districts, was the best ever collected in B.C. and one of the finest in Canada.

Considerable space in the Forestry Building was taken up by the exhibit and if the ore in sight were run through the crushers and concentrators there would result many thousands of dollars worth of copper, gold, silver, platinum, lead, zinc and other minerals.

A large collection of rare stones and minerals gathered from all over the world caused considerable interest.

It would be hard to select the most interesting exhibit, there were so many attractive ones. Much attention was shown to that from Nelson, which contained ores from Ainsworth and Sheep Creek. There were also special exhibits from Surf Inlet, the Dolly Varden, Britannia, Granby, Trail, Drum Lummon, Bear River, Portland Canal and a score of other districts. Good samples were on exhibit from R. N. Neill's famous Premier mine. The far-famed Engineer mine of Atlin had a fine exhibit of gold ores. An interesting display was that of concentrates from Surf Inlet gold ores, Ypres on the P.G.E., Gambier Island, Alta Lake, the Skeena, Queen Charlotte Islands, the Bush mines, were all to be seen in good array. There was silver and gold, copper and zinc, magnetite, wolframite, scheelite, mercury, bismuth, molybdenite and a score of other desirable metals and ores, and many other exhibits too numerous to mention.

A Faust concentrator was in operation showing the gold running over the tables. The concentrator handled at different times gold, silver, lead and zinc. Mr. F. H. Lamey was in charge and explained the process.

The display of mining machinery and equipment proved of great interest.

List of Awards.

The judge of the mineral exhibits at the Vancouver Exhibition was J. M. Turnbull, B.Sc., professor of mineralogy, University of British Columbia. Following is the complete official prize list:

Best exhibit of natural mineral salts. Basque Chemical Product Co.

Best general exhibits of ores, first (gold medal), Kootenay district, entered by Fred A. Starkey; second (silver medal), Portland Canal district, entered by Stewart Prospectors' Association.

Exhibits of ores from mines in various districts, first (gold medal), Kamloops, entered by Max Cameron, from the Kathleen group; second (silver medal), Coast district, from the Drum Lummon Mines.

Best exhibit of silver ore, Dolly Varden Mines.

Best exhibit of copper ore, Drum Lummon Mines.

Best exhibit of gold ore, Surf Inlet Gold Mines, Ltd.

Best exhibit of gold-copper ores, Bowena Copper Mines, Ltd.

Best exhibit of coal tar products, The Barret Co.

Best exhibit of molybdenite, Index Molybdenite Co.

Best exhibit of hand samples by individual prospects, first, Gretna group, Alberni district; second, P. Gilhoe, Spence's Bridge, and third, D. A. McKinnon, Vancouver.

The Drum Lummon Mines entered a splendid exhibit which attracted much attention from mining men. The specimens were taken from a mine on Douglas Channel, which is now shipping high grade ore and concentrates. The ore body is bornite and chalcocite with free gold.

NORTHERN ONTARIO.

The new policy recently adopted by the Baldwin Gold Mining Company in disposing of treasury shares without commission or brokerage charge is one that is looked upon with considerable favor in Northern Ontario. While it is only reasonable that in a good many cases there should be more or less expense in connection with disposing of shares in new mining enterprise, and while there has been no general complaint against charging commission sufficient to make it worth while for financial and brokerage houses to use their organization for the purpose of financing new developments, yet there have been a number of instances where the commissions charged, or the rake-off secured by the underwriters has been decidedly unreasonable.

The general impression appears to be that if other new companies would adopt a somewhat similar policy as has the Baldwin the ultimate result would be more favorable in that the money subscribed for shares would actually find its way toward development work, and not be "carved" to such an extent as to allow pennies to be devoted toward mining where in reality dollars may have been subscribed.

According to opinion in the north, it would perhaps be too much to expect that all new companies could arrange to do their own financing. Indeed, many of the brokerage firms are performing excellent service in raising finances for the development of mining properties. The impression appears to be that these concerns should continue to be encouraged, and an endeavor made to eliminate any of the concerns which abuse their privileges. In this such a policy as that adopted by the Baldwin Gold Mines should help, while the intention of the Ontario Government to enforce the Ontario Companys' Act should in a general way serve to elevate Ontario mining promotions to their proper plane.

The Argonaut Gold Mines, Ltd., a company which was recently organized for the purpose of taking over La Mine D'Or Huronia as well as a number of the adjoining claims, has completed the re-construction of the mill which was installed on the property several years ago. It is planned to use the mill as a testing plant for the time being.

The property is situated close to Beaverhouse Lake, along the east boundary of the township of Gauthier, in the Larder Lake district. Gold was discovered on the property several years ago, since which time considerable exploration work has been done. In a general way the result of exploration work has been quite favorable, and under efficient management and properly financed, the proposition would appear to be a mine in the making.

The Argonaut Gold Mine, Ltd., is stated to be a closed corporation. Mr. J. H. Rainville, ex-Deputy-Speaker in the House of Commons, being the president. The majority of those interested in the company are resident in Montreal, the head office of the company being in the Royal Trust Bldg., of that city. Mr. J. E. Hardman, of Montreal, is consulting engineer, while John W. Morrison has been engaged as general superintendent. Mr. Morrison is well known in this district, having managed the Lake Shore Mine of Kirkland Lake for a number of years.

During the week ended Sept. 12, the Coniagas shipped two cars containing approximately 137,125 pounds of ore. This is the first shipment from the Cobalt camp since the ending of the strike on the 7th inst.

During the course of the labor strike, the McKinley-Darragh was the only company to ship ore, while the Nipissing sent out a limited amount of silver bullion which had been held in storage at the mine.

The Nipissing Extension Mines, Ltd., which was just recently incorporated under the laws of Ontario, has since purchased property formerly owned by Nipissing Extension Mining Company, as well as the property formerly owned by the Farah Mining Company. It will be recalled that a discovery of high grade ore was made at outcrop on the Farah property in June, last.

The company has an authorized capital of $3,000,000, some $2,000,000 of which is outstanding and with $1,000,000 in the treasury.

A. J. Young, president of the new company, is well known in the north, being president of the Northern Customs Concentrators, Ltd. The vice-president, W. E. Stevenson, was formerly a director of the Temiskaming and other companies, and at present is a director of the Beaver. Hon. Albert Loening, New York, who is a director once served as United States Consul in Europe, and was a former commissioner of Texas for the city of New York. John W. Pickup, one of the directors, is a member of the firm of Fasken, Robertson, Chadwick & Sedgewick, and is intimately associated with a number of the mining companies operating in this district. M. Abbott Kimball, New York, is also a director of the new company.

Major Birkett, who will be resident manager, is a graduate of Queen's University and the Kingston School of Mines. In the early days he was in Cobalt, and later entered the Gowganda field. At the time of the outbreak of war he was general superintendent of the DeLamar Mine, Idaho, and which was then owned by the London Consolidated Mines Company, at which time Major Birkett joined the Canadian Expeditionary Forces.

"A collapse in the cost of material, the cost of labor, and the cost of living is in sight," declared a prominent mining man during the course of an interview this week with the writer. "The producing capacity of plants in the United States in 1914 was twenty-four billion dollars. The producing capacity of plants in that country is at present ninety billion dollars. Figured on a basis of prices obtaining in 1914 the present capacity is fifty billion dollars, or an increase of over one hundred per cent. The population of the United States increased only ten per cent, and ninety per cent of the increased output has been absorbed in foreign countries, the majority of which will now reduce imports to a minimum. The result will be unprecedented competition in the United States, followed by the closing of a large number of plants, a collapse in prices, very considerable unemployment, and a collapse in wages."

Asked as to what effect such a development would have on the mining industry, this mining man declared that it would "mark the commencement of one of the greatest booms ever known, particularly in connection with the gold mining industry. This, owing to the fact that the greater the collapse in wages the cheaper it will be to produce gold, and the greater the collapse in the cost of material and supplies, the greater will be the purchasing power of gold." He further declared that, in his opinion, as a result of developments of the immediate future the intrinsic value of gold mines would record a steady increase, and that already many big financial concerns were seeking opportunities

to place large sums in the shares of the important gold mining companies.

As though in corroboration of this view, is the statement by H. C. Hoover, who on his arrival at New York from overseas declared that "we have entirely passed the crest of high prices."

After examining a group of claims situated in the township of Katrine in the Larder Lake gold area, the Nipissing Mining Company has not been sufficiently encouraged to take over the property.

It is understood that some high grade gold ore is in evidence, but occurs chiefly in quartz stringers, and with the stringers not numerous enough to make the entire dike in which they occur of commercial value.

The proposition, it would appear, is characteristic of the Larder Lake district, where high grade shoots are found to be narrow and isolated, and where, according to government geologists, the success of mining will depend upon whether or not bodies of low grade ore will develop in sufficient quantity to be profitable to mine.

Cross-cutting at the top of a raise from the 310-ft. level a new vein has been encountered on the Adanac. At the point where cut the vein is about three inches in width, the composition being calcite containing fairly heavy leaf silver. It is too soon to be able to tell whether or not the find will prove to be of importance.

The Dome Mines, treating ore at the rate of upwards of 900 tons daily, and now taking steps to increase working forces by another hundred men, would appear likely to be operating at full blast before the end of the current year. The addition of 100 men to present working forces should serve to add about 400 tons daily above the present rate, and bring the plant up to full capacity of around 1,350 tons daily.

Development work is understood to continue favorable, and there appears to be an altogether optimistic outlook for the mine.

In some instances very considerable difficulty is still being experienced in securing a satisfactory number of men with which to carry on operations at the desired capacity at some of the mines in the gold district. The general impression appears to be that the arrival of winter will in all probability bring the desired relief, and, instead of working under capacity, the influx of men due to increasing unemployment in the cities will make it possible to operate at full blast.

The situation appears to offer an opportunity for the excess labor supply in the larger centres in old Ontario, to be absorbed in part at least in the gold mines of the Porcupine district where working and living conditions are very favorable, and where high wages are being paid. Working at a mine does not necessarily mean working underground. Forces are divided between surface and underground, some working in the mining plants and mills and others preferring to work underground. During the winter months the majority endeavor to get underground work where the temperature always remains the same, winter or summer.

Work is being carried on aggressively on the property of the Boston-McCrea Company, in the Boston Creek district. Although it was only during the past summer that the new company was formed, a large amount of exploration work has been done, and a number of important discoveries have been made.

Before commencing operations, Alfred R. Whitman, mining geologist, was engaged to examine the ground and offer advice. As a consequence of this, the work carried on has been systematic. So far, work has been confined to exploring the surface, and sinking shallow test-pits. Tellurides of gold have been found to occur in spectacular quantities, and assays show a gold content in the various deposits ranging all the way from around $1 or $2 to as high as several thousand dollars to the ton. Just as soon as the vein system is thoroughly explored on surface, the work of developing the more important veins will be gone ahead with, toward which end an electrically driven mining plant will be installed and sinking operations commenced.

During the past week a party of visitors, among whom were the following, spent several days at the property: E. L. Wettlaufer, Toronto; Geo. W. Morris, James W. Savage and C. F. Jordan, Buffalo; and N. W. Kirkpatrick, Dayton. Ohio.

With about 58 per cent of the total gold output of the Dominion coming from Northern Ontario, and with a probable extensive increase in output during the next year or so, the gold mines situated in the district of Temiskaming are taking on added importance. According to present indications, the gold mines of Porcupine and of Kirkland Lake, during 1920 will produce approximately seventeen per cent as much gold as the total output of the United States for one year. In spite of the present shortage of labor at Porcupine the production is now averaging close to one million dollars every thirty days. For the whole of 1920, with the labor dispute at Kirkland Lake settled, and with adequate working forces at Porcupine, and with the addition of one producer in the Boston Creek district, the output should exceed fifteen million dollars for the year.

According to the annual statement, the Porcupine Crown Mines, Limited, had a surplus of about $260,000 at the beginning of 1919. At the annual meeting held January 22nd, 1919, it was announced that ore reserves approximated $500,000. Owing to adverse economic conditions caused by the war, the mine was closed down about the middle of 1918. In the early spring of 1919 it was re-opened, but at the beginning of September the mill was still idle. It is planned, however, to resume production at an early date. The company is recognized as being conservative and the management is efficient. At the middle of September quotations on the open market place a value of from 31 to 32 cents a share. Taking all visible evidence into consideration the current quotations appear reasonable, and, with production once more under way a limited increase might follow. Up to the end of 1917 the company had paid dividends at the rate of 12 per cent annually. As to whether or not such a high rate can again be established seems problematical, although a moderate return for a limited period appears probable. The mine secures its income from one vein which has already been developed to a depth of 1,100 feet. For this reason it does not present very great possibilities of adding to ore reserves to more than more or less limited extent. The mine is equipped with a first class mining plant and a mill with a capacity for treating about 140 tons of ore daily. At from 30 to 40 cents a share it appears comparatively safe.

NOVA SCOTIA NOTES.

The Nova Scotia Steel & Coal Company is understood to be developing the lower seam in the Jubilee Shaft at Sidney Mines. The so-called Jubilee seam has two divisions, known as "Jubilee 'A' " and "Jubilee 'B' ". The top seam has been worked more extensively, but the coal it produces is not suited for metallurgical uses, and it has not been found possible to work this seam as regularly as the other seam in the Sidney Mines area. About twenty years ago a shaft was sunk to the lower seam, and a small area of workings was developed around the shaft bottom, after which the mine was temporarily abandoned. Quite recently a new shaft was sunk, also reaching the lower seam. For some time three headings have been driving to connect the old and new shafts and these headings have now been driven through. In the lower seam it is understood that a long wall face is developed, and if other conditions prove satisfactory, the output from this lower seam can be increased to any desired extent. The seam has an average thickness of 3 ft. 6 in., which is significent of the conditions obtaining in Nova Scotia that are forcing the development of the thinner seams.

In the "A" Jubilee seam, the Scotia Company has for some time been using a storage-battery electric locomotive for haulage purposes, with excellent results, so it is said. So far as the writer knows this is the only storage-battery locomotive in use in a Nova Scotia coal mine, and it points in the direction of the extended use of electricity in underground operations. Electric power in some form offers the only known motive power by which the development of the submarine coal areas off Cape Breton Island can be carried out. Steam and compressed air have limits of transmission that are too small to allow of their use in undersea workings to the extent that these workings are likely to reach in the future.

Dominion Coal Company:

The transformer house and three transformers at No. 7 Colliery were recently destroyed by fire.

The collieries in the Glace Bay district were idle on the 17th September for a local peace celebration. In publishing its decision to enforce a 24-hours' strike in the local collieries on this date in protest against the refusal of bail to the Winnipeg strike leaders, the U.M.W. leaders did not mention that it had previously been arranged that this date was to be observed as a general holiday.

The publishing of inaccurate rumors as to impending changes in officials at the headquarters of the Dominion Coal Company, has lately assumed annoying frequency. The possibility of obtaining accurate information by enquiry from those who are in a position to know, and the personal annoyance and even worse things that follow these irresponsible rumors, do not seem to occur to those who originate these rumors. The rule appears to be, publish the rumor first and the contradiction afterwards. Unfortunately, a thoughtlessly published newspaper rumor may damage or destroy a reputation gained by long years of endeavor.

A reflex of the slackness in the steel trade is seen in a recent report from Glace Bay that slack coal is being banked out at the No. 2 Colliery of the Dominion Coal Company. Owing to the practical stoppage of coke manufacture at Sydney—only sufficient coke is being made to keep the ovens heated—an outlet for some 3,000 tons of slack coal per day is temporarily closed. The genesis of the Dominion Steel Company was in the necessity for an outlet for slack coal, which formerly had been sold to New England gas companies at unremunerative prices, and the cessation of coke manufacture in Sydney has caused a recurrence of the old problem.

The Dominion Coal Company possesses a very fine coal-washery which was designed to wash slack coal for the Montreal market. A very saleable product was delivered from this washery before the war, but the plant has not been put to the extensive use that was contemplated when it was erected because of the demand for coal during the war, and the large amount of slack coal required for coking purposes, which on occasions even required coal to be crushed to slack to make up the shortage in the screened slack coal.

If the Dominion Company can find transportation for the washed slack, it will probably decide to commence washing slack coal for the Montreal market as was originally intended.

It is an interesting coincidence that an exactly similar reversal of slack demand was during the past week reported from Sydney, Australia, where owing to the stoppage of steel manufacture, a surplus of slack coal is accumulating.

The Late George Gray of Stellarton, N.S.

With much regret we learn of the death of Mr. George Gray of Stellarton. Mr. Gray was the doyen of the Nova Scotia coal trade. His connection with the Acadia Coal Company commenced in 1883 as a clerk in the office, from which position he rose to be the assistant general manager.

Mr. Gray's abilities as an executive and his understanding of labor difficulties were well known, and few men had such an all-round knowledge of the daily round of the operation of coal mines and the business of selling coal.

Mr. Gray took a keen interest in the duties of a citizen, and was prominent in all works of relief and mercy. As a citizen, and as an adviser in the difficult times through which the coal industry is passing, Mr. Gray's loss will be much felt. He had worked hard all his life and was looking forward to some well-earned leisure when he was attacked by a hopeless malady. Mr. Gray's death removes an outstanding figure in the Nova Scotian coal industry, and he can be ill spared.

Inverness District.

The management of the Inverness Colliery, which is being operated under conditions of unusual difficulty, have asked the workmen to consent to a reduction in wages, but so far the men have not consented to this suggestion. It is stated that the mine now employs 673 men, of which 390 are producers. The production per man employed is less than a ton per day. The Inverness Colliery, unfortunately has reached a point in its development when it can only be operated under conditions of high selling price for coal. It is the only operating colliery now left in Inverness county, except a small enterprise at Port Hood, and it is to be feared that production in Inverness will still further decline. The only hope for Inverness county to remain a factor in the coal trade consists in the possibility that some day a strong company, with adequate capital, may con-

solidate under one ownership all the coal properties in the county.

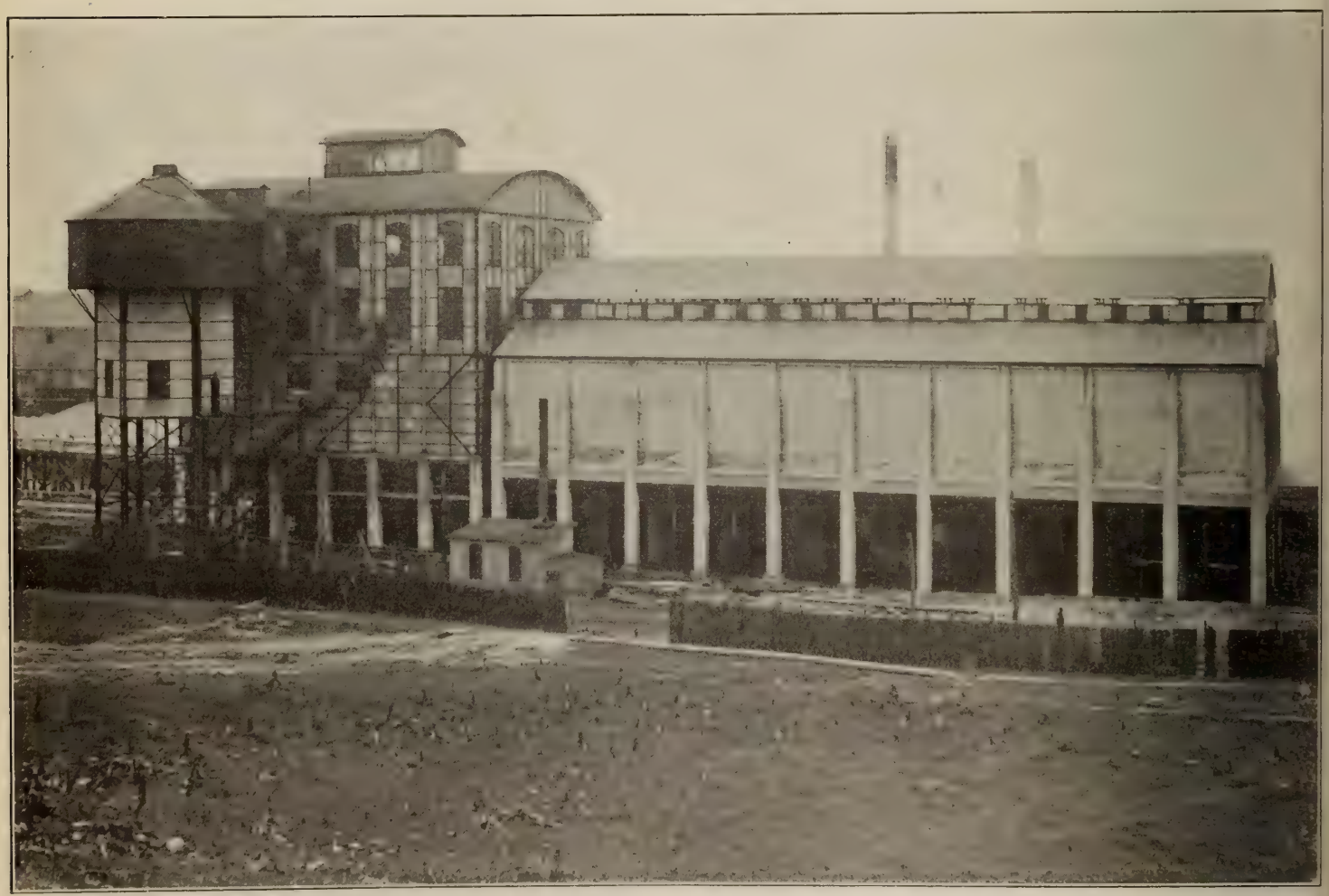
J. Allan MacDonald, manager of No. 10 Colliery of the Dominion Coal Company, was accidentally shot on a hunting trip and died as a result of his wounds. Mr. MacDonald had been in the service of the Dominion Coal Company all his life, having come to the Glace Bay district from Springhill Mines as a boy. He had risen by merit to be manager of the colliery where he was for a number of years the underground manager, and his death, by accident, deprives the Dominion Coal Company of a valuable official in the prime of life.

Minto, N.B.

A Board of Conciliation has been granted to consider the demands of the workmen at the Minto Mines. Local mining is being conducted under the limited conditions that the limited nature of the coal occurrences permits, and some of the requests of the miners, such as for check-weigh men, may require to be conditioned by the relative smallness of the industry in this neighborhood. This point does not seem to be quite realized.

Newfoundland.

Encouraging reports of development in the St. George's Coal Fields' properties are heard. Exposures of the Jukes' seam on the Barachois River are said to have revealed up to 11 feet thickness of coal, but these reports must be accepted with reserve, as the coal occurrences in this neighborhood consist of seams highly inclined, and the measurements may not have been taken at right angles to the roof measures. The "Journal" is endeavoring to obtain accurate information on this interesting coal deposit. The lack of coal in Newfoundland is one of that colony's economic drawbacks, and any important coal occurrence there would have great meaning for the newly created Dominion of Newfoundland. Again the occurrence of coal on the other side of the Cabot Straits is quite evidently a continuance of the ancient coalfield which underlies portions of Nova Scotia and New Brunswick, and has an unknown extension under the Gulf and the Cabot Straits, and for this second reason much geological interest attaches to coal occurrences in Newfoundland.



Dominion Coal Company's Baum Coal Washer at Sydney, shows Washer and Storage Hoppers for washed slack.

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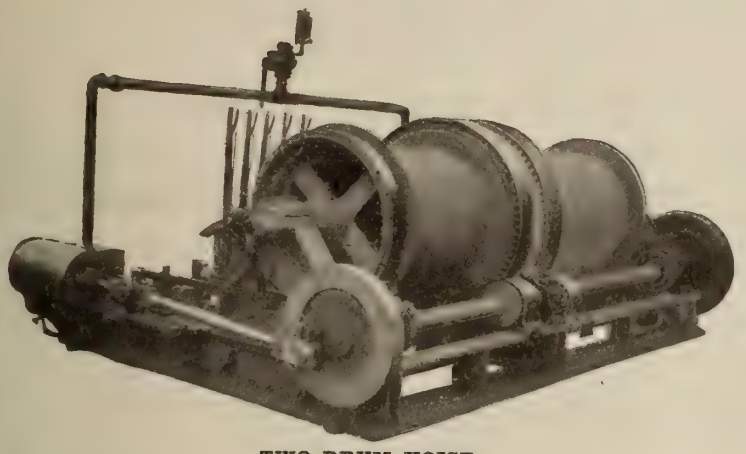
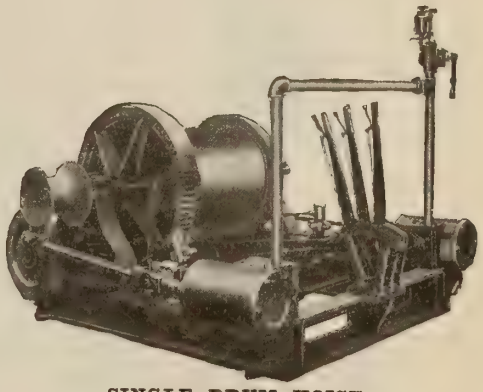


TWO DRUM HOIST



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Vancouver Starts Plans for the Western Meeting of the Canadian Mining Institute.

With Dr. E. T. Hodge as organizer of the General Western meeting of the Canadian Mining Institute, to be held in Vancouver, Nov. 26 to 28, all members of the Institute may rest assured that they will have one great big time in the Western centre of Canadian mining.

Plans are being made which will insure the success of this meeting from every point of view. Readers of the Mining Journal will find something in the way of plans for this meeting in every weeks issue from now on. We want every member to read it and come on out and see our great big West if you have not already seen it. Those that have come again and renew old acquaintances, and see what we are doing out here in this great live country.

An endeavor is being made to raise additional finances preparatory to resuming work in due course on the property of the Baldwin Gold Mines, at Kenogami station, a few miles north from Swastika.

Before the labor strike caused curtailment of operations a shaft was driven to a depth of 215 feet on the Baldwin, and about 175 feet of cross-cutting was done, during the course of which considerable encouragement was met with. The property is equipped with a steam driven mining plant.

Mr. Charles Camsell of Dominion Geological Survey Returns From Kettle Valley District.

On Sept. 2 Mr. Charles Camsell of the Dominion Geological Survey arrived in Vancouver after a two weeks trip during which he surveyed gold deposits along the Kettle Valley Railway line. He reports many rich gold quartz veins. The "Emancipation" mine is the only lode working along the line and though it contains high grade ore, operations are carried on in a small way. The cost of labor and equipment has advanced considerably during the last few years and the price of gold has remained stationary, making it impossible to operate gold mines at a profit unless they are very high grade.

By placer methods of mining prospectors have discovered these same veins running across Siwash Creek and the Fraser River about Yale. By a slow process of denudation these veins have supplied much of the gold that has been taken from these streams. Estimates place the value of that taken from Siwash Creek at $3,000,000. Very little placer mining is carried on in this district now.

PERSONALS.

Mr. J. P. Gordon has returned to The Pas after a visit to Toronto.

Mr. Evered and Mr. Moodie of the Davidson Gold Mines are visiting the Herrick gold property, Wasapika area.

Mr. R. E. Hore has returned to Toronto after examining properties in the Wasapika area. He looked over a group of claims there and has directed attention to an area where the geological conditions are favorable for gold deposits.

Dr. W. G. Miller, Provincial Geologist of Ontario, who is at present in London as Canada's representative of the Imperial Mineral Resources' Bureau, expects to return to Toronto in October.

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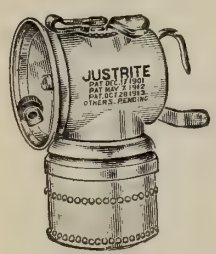

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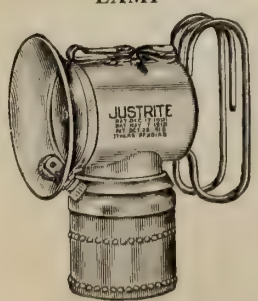

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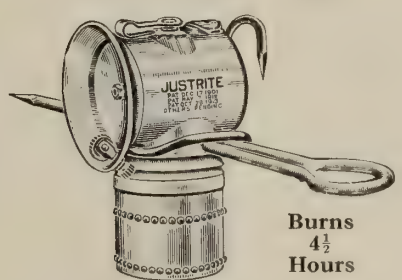

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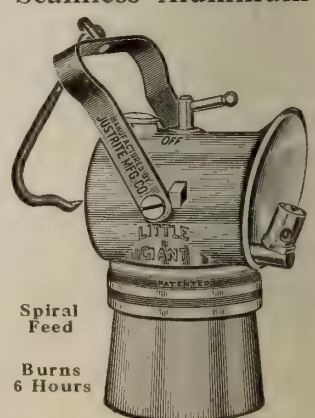

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EDITORIAL

ASIATIC COAL SUPREMACY.

The "Journal" reprints a condensed extract from the *Economiste Francaise* on the coal resources of the world, which is interesting in that the writer, Gaston Cadoux, has grasped, what the "Journal" several years ago pointed out, that the great anthracite reserve of the world lies in the Continent of Asia, and nearly all of it at that within the borders of China. M. Cadoux points out that it is already established that in China alone there is four times as much anthracite as in the rest of the world put together, and that while the coal reserves of Europe and America are fairly well defined as to quantity, the coal occurrences of China are only partially prospected.

China is one of the mysteries of the present age, and a greater mystery of the future. A perusal of the history of China will reveal that this vast territorial unit has passed through periods of magnificence, followed by periods of decay, and again followed by a rise in extent of territory and government, that have succeeded each other with almost monotonous alternation. In the history of China, the record of a single dynasty may cover 600 years, and be but an episode in the long story of successive decline and rise of national importance.

Should China repeat her traditional historical phases, and under some strong hand rise once more with all the resources of modern science, backed by internal reserves of coal and iron that exceed those of all the outer world. what may not this patient and resourceful nation achieve?

Many careful people fear the rise of Japan as a world power, but Japan must always be limited by her small resources of coal and iron, and by the small extent of her native islands, and the potentialities of the Japanese are meagre compared with the infinite possibilities of China. The vast reaches of Asia which lie between Tibet and the headwaters of the Yang'tse, are unknown, but time was when the rule of China extended to the borders of India. It may conceivably do so again.

If it is true that national power is derived largely from the possession of coal and iron, and who can doubt it after 1914-1919?—the hordes of Cathay are worth our attention. They have the essential raw materials of modern industrial civilization, they are very very numerous, and their form of national culture, while it may not appeal to Western minds, has not indeed occasioned a greater catastrophe than befell Europe but lately.

NEWFOUNDLAND NEEDS A GOVERNMENT GEOLOGIST.

Since the death of Mr. Howley, the Government of Newfoundland has not appointed a successor in the appointment as Government Geologist which Mr. Howley held for many years.

This strikes us as a regrettable omission. If any country needs a competent geologist it is the newly created Dominion of Newfoundland. The agricultural wealth of Newfoundland can never occupy the status it does in countries with longer hours of sunshine and fewer pre-Cambrian exposures. Newfoundland is known to contain asbestos, chrome, iron, in tremendous quantity; some coal, copper, limestone, lead, and many other minerals, but the country has never been thoroughly geologically surveyed and mapped. The task of doing this would be a difficult and expensive one, but it would be well worth while.

A recent article in the "Journal" told of some of the humors and some of the tragedies of prospecting and mining in Newfoundland, and in too many cases lost endeavour and mis-spent expenditures have been caused by inexact information. No country can hold its own in the modern race if it does not strive to the utmost to develop its natural resources, and when these resources are largely mineral, the services of a competent geologist are of first-class importance.

A country that possesses what is probably the most important hematite ore reserve in the north temperate zone is justified in employing the very best geologist obtainable. It is difficult to over-estimate the value of the Wabana iron ore deposit to the British Empire. The quality of the ore, its geographical location, its ownership by one of the associated British peoples as sturdy and valiant as Newfoundland has proved itself to be; the apparently illimitable quantity of ore present, and the lessening quantity of iron ore in the known reserves of North America, all go to make the Wabana deposit enormously important. The most authoritative report on the Wabana deposit was compiled under the direction and at the expense of the Canadian Department of Mines. The information contained in that Report was considered to be necessary to Canada. How much more does Newfoundland need such information for herself. A government geologist in Newfoundland is not a luxury, but a business necessity.

THE DESIRABILITY FOR STANDARDIZATION OF MINE-RESCUL APPARATUS.

In this issue of the "Journal" will be found a paper summarizing the development of mine-rescue apparatus, or, as we prefer to call it, the development of self-contained oxygen breathing-apparatus for use in mine rescue operations, which is a plea for standardization of apparatus and of training methods. Few who have had experience in these matters will dissent from the views expressed.

The paper mentions that the first oxygen breathing apparatus to be used in the United States were four sets imported in 1907 by the Anaconda Company, followed in September 1908 by purchases for the Technologic Branch of the U.S. Geological Survey for use in mine rescue work.

It may be of interest to mention that a self-contained breathing apparatus of the Giersberg type, the forerunner of the Draeger apparatus (the Draeger apparatus having been developed from the Fleuss apparatus), was purchased much previous to this date by the Nova Scotia Steel & Coal Company at Sydney Mines. In 1907, the Dominion Coal Company erected the first rescue station in America, and equipped it with Draeger apparatus. A sample apparatus was brought to Glace Bay in the Spring of 1907. As an instance of how little was known of these devices, it may be mentioned that the Captain of the Allan liner that brought this apparatus over, in passengers' baggage, insisted that it be housed on the boat-deck of the steamer in case it might explode and prove a source of danger to the vessel. Since this time, self-contained oxygen breathing-apparatus has become a recognized part of the fire-fighting equipment of a modern liner, and they were used in the Navy during the war for purposes that the ordinary gas mask will not accomplish.

We believe that great damage has been done to the proper understanding of the functions of breathing apparatus by the use of the term "rescue-apparatus." The proper function of these devices is as an adjunct to the colliery fire-brigade. Their usefulness in fighting mine fires has always been less open to question than their utility as a means of rescuing the victims of a coal-mine explosion.

The United States was not first in the introduction of breathing apparatus as a device to assist in mine-rescue work, but since these devices were adopted by our neighbours, they have shown a much better understanding of their proper function than has been the case in England for example. In England, the Home Office authorities prescribed the provision of breathing apparatus, but neglected to provide machinery to regulate their manufacture, or in any way to develop a standard approved type suited to English methods and ideas. In the United States, however, the Government led the way, and has developed a standard apparatus, after much trial and expenditure; and by a lavish dissemination of literature, it has educated the mining world not only to the great advantages of the self-contained breathing apparatus, but has directed attention to its limitations and is special functions. This is a much better proceeding than the damming of one apparatus by the sales agents of a rival type, resulting in an unsettled public confidence in all types.

The mining engineer who neglects to avail himself of the advantages which arise from the provision of modern breathing apparatus, and a corps of trained users, is not well advised.

The use of breathing apparatus is not by any means confined to mines. During the war, breathing apparatus was twice used in Sydney Harbour to remove burning sugar cargoes, on each occasion very successfully. Of other uses of breathing apparatus during the war, every member of a Tunnelling Corps is able to give first-hand evidence.

THE TALC INDUSTRY.

Of some interest to Canada is the formation of the Talc and Soapstone Producers' Association of the United States. While the production of talc from Canadian mines is not large, yet the industry is growing very quickly, the value of the talc mined in Canada being in 1918 three times what it was in 1914, and twice the value of the 1917 production.

The imports of talc into the United States ground or prepared, amount to approximately $250,000 worth per year, but importations are declining because of the growth of the home industry.

The formation of the new Association will doubtless occasion improvements in the practice of talc preparation, and will also no doubt keep prominently before it the welfare of the United States producer. Some attention to the proceedings of the Association will be worth the while of Canadian talc miners, as a great deal of the talc mined in Canada is exported to the United States to be prepared for the various uses to which talc is put. The use of talc for the manufacture of face powder is not the main outlet for the product of the industry, as might be popularly supposed.

PERSONALS.

A fair number of the members of the Canadian Mining Institute attended the Chicago meeting of the A.I.M.M.E., which opened on the 22nd September. Among these were included Dr. Alfred W. G. Wilson, of the Geological Survey, and Mr. John McLeish of the Mineral Resources Bureau of the Mines Branch. Mr. W. R. Rogers of the Ontario Mines Department was in charge of a complete and representative exhibit of Ontario minerals at the National Exposition of Chemical Industry, associated with the A.I.M.M.E. meeting.

The "Journal" was represented by Mr. H. W. Thompson, of the Toronto, and by the Editor.

Mr. A. R. Chambers, assistant mining engineer of the Nova Scotia Steel & Coal Company, New Glasgow, was also in attendance at the meetings.

The Gold Discovery at Copper Lake, Northern Manitoba

By R. C. WALLACE.

As fairly wide publicity has apparently been given to the discovery of gold at Copper Lake, Northern Manitoba, the following details with reference to the situation may be of service.

Location and Means of Access.

Copper Lake is situated on the headwaters of the Grass River, which empties eastward into the Nelson River. The Grass River may be reached from Mile 82, Hudson Bay Railway by a wagon road 10¾ miles in length into Herb Lake. The easiest route to Copper Lake, is, however, via Cumberland House and Sturgeon Landing, to which there is a weekly steamboat service from The Pas, and thence by canoe into Athapapuskow Lake and eastwards into the Cranberry Lakes at the headwaters of the Grass River. Copper Lake empties from the north through Brunne and Bear Lake, into the Second Cranberry Lake. The steamboat journey is made in one and a half days, and the canoe route from Sturgeon Landing to Copper Lake can be traversed in two days.

Geological Features.

Copper and Brunne Lakes lie in a somewhat restricted band of sheared greenstone and fine grained porphyry flanked on the east and west by a reddish granite which on the western contact is fairly basic. The strike of the rock is forty degrees east and the belt is elongated in the direction of the strike. Within the belt lie Copper and Brunne Lakes, and the mineral discoveries have been made on the east, but mainly on the west side of these lakes. The intrusions from the granite into the belt consist of irregular veins and masses of a very fine grained pinkish granite which is apparently identical mineralogically with the main granite.

Mineral Occurrences.

While there is a variety of mineral occurrences in this district, the discovery of a very rich shoot of gold on the property now known as the Red Rose has served to attract attention to this district as a whole and to the other properties already discovered in the district. The shoot appears on the east wall of a vertical quartz vein eighteen inches wide and occupies three inches on that wall. A pit has been sunk six feet deep on the shoot which apparently pitches steeply northwards in the vein and which may be seen at the bottom of the pit on the north side. The highly sheared and somewhat decomposed greenstone on the east wall of the vein shows very coarse gold in panning across 2½ feet at the bottom of the pit. The vein has been stripped

Canoe Route from Sturgeon Landing to Athapapuskow and Cranberry Lakes.

for two hundred feet and varies in width from eighteen inches to six inches. There has been considerable shearing in the zone in which the vein lies and breaking has taken place on planes transverse to the strike of the rock. On the adjoining claim to the south, in what is probably the same zone, reduplicated folding of a vein eighteen inches thick is very clearly shown. The pit on the Red Rose has been roofed over and locked down.

Less than a claim's width west of this vein a parallel quartz lode has been prospected over five claims by J. P. Gordon who later staked the Red Rose. This lode is well exposed over two thousand feet on the two most northerly claims, with cross trenches varying in width from fifteen to thirty feet. The other claims have not yet been sufficiently prospected to determine the extension of the lode, but on the fourth claim a large vein of quartz and country rock, less than half of which is quartz, is exposed for a width of 100 feet. The total length of the lode cannot be estimated until more work is done on the claims. To the north, three-quarters of a mile beyond a beaver dam lake, on the projection of the line of strike of the lode (42 deg. east) a vein has been cross-trenched by Petersen to a width of eighteen feet, showing much heavier galena mineralization than on the properties to the south. Galena is, however, a characteristic mineral in all the quartz outcrops along the line of strike, fine-grained except on the more northerly showings, associated with a little pyrite and occasionally chalcopyrite. In places the quartz has a rather peculiar cherty aspect, and owing to cross-strains breaks with a cleavage not unlike that of calcite. Preliminary cross-channel assays have been obtained which have indicated fairly high values in gold in this lode. The results of more detailed samplings are not yet known.

South of Gordon's claims and on a parallel line slightly further east, a series of claims have been staked from the south shore of Copper Lake, south-westwards along the west shore of Brunne Lake. These claims are now being prospected and on the more northerly claims of the group molybdenite and pyrite are the chief sulphides in a vein up to three and a half feet in width, while on claims 4 and 5 west of Brunne Lake, somewhat irregular masses of quartz carry abundant pyrite, some galena and chalcopyrite and no molybdenite. No information is yet available as to values on these (the "Dominion") claims. Still further east on a parallel line of strike a carbonaceous schist has been impregnated with pyrite and phyrrotite. Prospecting has been done on the northeast arm of Copper Lake and at the extreme end of the south arm of Copper Lake and along the west shore of Brunne Lake. Some idea of the extent of this iron sulphide mineralization may be obtained from the fact that on the Caribou claim west of Brunne Lake a rounded hill is well exposed on the line of strike of the iron formation at least seventy-five feet wide and is mineralized throughout with practically solid pyrite and phyrrotite. In places, as at the south end of Copper Lake, the iron sulphide bands are associated with bands of quartz only sparsely mineralized with pyrite. It would appear that this type of mineralization has affected a series of parallel bands of schist, between which lie bands of unmineralized massive greenstone.

Pit on Gold Shoot "Red Rose" Copper Lake, Man.

Economic Situation.

The importance in itself of the gold shoot on the Red Rose claim cannot at the present moment be accurately estimated owing to the fact that no considerable body of quartz has yet been uncovered in the line of strike in which this shoot appears. It is, however, significant as indicating the presence of gold in quantity at one place in a district where quartz and iron sulphide bodies are so extensively developed and particularly owing to the fact of its close proximity to an extensive quartz lode, preliminary sampling of which shows very encouraging results.

The district is somewhat restricted in area, though the limit of the narrow tongues of greenstone which extend northeast and southwest from the main area have not yet been fully defined. There is a remarkably

diversified mineralization within this area. The gold showing on the Red Rose points to the fact that at the time of the mineralization which affected the large quartz bodies as well as the smaller veinlets, very considerable gold was being carried into the quartz. The quartz and iron sulphide lodes should be thoroughly investigated by companies which are prepared to handle development work on an extensive scale.

Considerably more ground has been staked in the district than has yet been prospected even in a preliminary fashion. Apart from this unprospected territory, attention might well be directed to the greenstone belt northwest of the First Cranberry Lake, to that belt north of Twin Lake and west of Brunne Lake and to the extension of the Copper Lake belt northeast towards Separate Creek.

Big Lode Contact-Extension Claim, Copper Lake, Man.

THE NATURAL GAS AND PETROLEUM ASSOCIATION OF CANADA.

First Annual Convention.

The Natural Gas and Petroleum Association of Canada held its first annual convention at Hamilton, Ont., on September 19, 1919.

The sessions were held at the Royal Connaught Hotel. There was an attendance of upwards of 90 members and guests, and the report of the membership committee showed a growth of 57 per cent in the membership since the organization meeting last June. When the convention opened the association had a membership of 106, including 85 active, 18 company and 3 associate members. This number was largely increased in the course of the convention.

President C. E. Steele of Port Colborne, occupied the chair throughout the sessions. At the business meeting opening at 2.30 p.m. reports were presented from several committees; and the laws and legislation committee was empowered to further to the best of its ability a number of important matters involving assessment of gas enterprises, disposal of salt water from wells, introduction of a short form of gas lease, amendments to the Boiler Inspection Act to permit the use of boilers of oil country standard type for drilling and reduction or removal of duty on drilling equipment not manufactured in Canada.

The financial report presented by Secretary-Treasurer S. A. Morse showed a substantial balance.

The following were unanimously elected honorary members of the Association: T. W. Gibson, Deputy Minister of Lands, Forests and Mines, Toronto; Dr. M. Y. Williams, Geological Survey of Canada; Dr. Dresser, Vice-President of the Canadian Mining Institute; W. B. Way, Secretary of the Natural Gas Association of America; E. S. Estlin, Natural Gas Commissioner for Ontario; G. R. Mickle, Mine Assessor for Ontario; and the President of the Canadian Gas Association.

Following the business session, A. M. McQueen, Vice-President of the Imperial Oil Company, gave a paper on "Petroleum in Ontario, Reminiscence and Forecast" tracing the history of the petroleum industry from its very beginnings.

Mr. G. R. Mickle, provincial mine assessor for Ontario, gave an interesting paper on some phases of the natural gas industry in the province.

A practical paper by J. H. Stoliker of the Union Natural Gas Company pumping plant at Port Alma, Ont., on "Oxo-Acetylene Welding in an Isolated Plant," opened an extensive discusion of the various uses of the oxo-acetylene torch in repair work.

At 6.30 p.m. the anual banquet of the Association was held in the Royal Connaught grill-room, with President C. E. Steele as toast-master.

Mr. D. A. Coste gave a very interesting paper on "The History of Natural Gas in Ontario," tracing the rise, development and present situation of the industry. The paper was of especial interest in that Mr. Coste drilled the first successful gas well in the old Essex field, which marked the beginnings of the industry in a practical form; and has been identified with the gas development in the province ever since.

Dr. M. Y. Wiliams of the Geological Survey of Canada outlined the findings of his recent survey trip to the prospective oil areas in the James Bay district, which will later be covered in detail by an official report. Short addresses were also given by W. B. Way, secretary of the Natural Gas Association of America, by T. W. Gibson, Deputy Minister of Lands, Forests and Mines, and by Dr. Dresser, Vice-President of the Canadian Mining Institute.

Resolutions were passed authorizing the board of directors to take up the matter of increased gas rates should they deem it advisable, and to secure data regarding the demand for nitro-glycerine for well-shooting in Ontario, with a view to the establishment of a factory in the province.

The convention will hold its next annual meeting at Chatham, Ontario, on October 15 and 16, 1920.

The association was organized at a meeting held at London on June 18, 1919, and the officers elected on that occasion will hold office till the 1920 meeting. They are:

President—C. E. Steel, Port Colborne.

Firse Vice-President—A. M. McQueen, Toronto.

Second Vice-President—T. P. Pinckard, Windsor.

Secretary-Treasurer—S. A. Morse, Chatham.

Directors:—R. F. Miller, Selkirk; A. W. Parks, Oil Springs; J. B. Williams, jr., Sarnia; D. A. Coste, Niagara Falls; P. S. Coats, Chatham; H. R. Davis, Buffalo, N.Y.

WORLD'S COAL RESOURCES.

America's Supremacy.

The Importance of Extracting By-Products.

Gaston Cadoux recently contributed an article to the *Economiste Francaise* on the coal resources of the world.

The subject is an important one, says the writer, despite the progress made in the methods of exploiting water-power. Industrial supremacy in the future will lie with the people who possess the greatest reserves of solid mineral fuel at the best prices; and as far as is known of the coal deposits of the world, Europe and even America will be out-distanced by Asia, unless Europe takes prompt measures to retain its superiority.

According to the report submitted to the International Geological Congress at Toronto in August, 1913, the world's reserves of solid mineral fuel are 7,397,553 million tons, of more or less easy etxraction and all at a workable depth. This figure comprised bituminous or dry coal, lignite, anthracite, and anthracite coal, and was divided as follows: 3,902,944 mill. tons dry coal, 2,997,763 mill. tons lignite, 496,846 mill. tons anthracite. The distribution is shown below in million tons:

	Lignite.	Coal.	Anthracite.	Total.
America. . . .	2,811,906	2,271,080	22,542	5,105,528
Asia	111,851	760,098	407,637	1,279,586
Europe	36,682	693,162	54,346	784,190
Oceania. . . .	36,270	113,481	659	170,410
Africa.	1,054	45,123	11,662	57,839
Totals. . . .	2,997,763	3,902,944	496,846	7,397,553

The relatively small deposits in Africa and Oceania may be disregarded in the present connection. America has by far the richest store; but the cost of exploitation detracts from the industrial value of the fuel as compared with that of Chinese coal, and the future Asiatic industry seems likely to be able to deliver coal at much lower cost. Although Asia contains much less lignite and bituminous coal than America, there is in China alone four times as much anthracite as in the rest of the world put together. Moreover, there is in Asia about 67 milliard more tons of coal than in Europe, and it must be remembered that although recent prospecting has discovered extensive anthracite beds in the plains of Shansi, Szechuan and Honan, no satisfactory or complete investigations have been made with regard to other coal reserves; while the returns for Europe, in particular for Britain, Germany, Belgium and France, leave little room for any future increase. Such considerations show that while Europe has little to fear from American rivalry, the new Asiatic industry will probably offer considerable competition, being in command of unlimited labour and abundant cheap coal. Every effort must therefore be made to retain the low price of coal and to achieve perfection in its utilization. The discovery and exploitation of natural gas, petrol reserves, and water power cannot, at present, bear any comparison with the advantages to be derived from the distribution of reserves of solid fuel.

In France, for instance, it is calculated that a thorough utilization of all water power will result in an annual economy of 8 to 9 mill. h.p.; but as industry will continue to develop while this result is being achieved, the consumption of coal will remain large. Pre-war consumption totalled 60 mill. tons per annum, and it may safely be estimated that the extension of electric power will represent from 30-35 or even 40 mill. tons each year. The demand for power will in all probability have doubled by that time, and if, out of a total consumption of fuel equal to 120 mill. tons of coal, 40 mill, may be economised by the use of electricity the annual consumption of coal will still be 70 to 80 mill. tons.

In order to compete successfully against the low prices of iron-ore, cast-iron and coal which will obtain in Asia, it is essential that all manufacturing processes be perfected as far as possible, and that the greatest economy and most scientific utilization of fuel be achieved. This problem has occupied manufacturers and economists for some years past, and a very clear exposition of the question as well as its solution appeared in the review *Chimie et Industrie,* November, 1918.

The solution is the substitution of electric power, wherever possible, for other kinds of power, and the use of coke, gas, heavy oils, benzol, etc., the by-products of coal, instead of raw coal as extracted from the mine. If the amount of coal at present consumed in a raw state was distilled before use, 5 milliard cu. m. of gas, 35 mill. tons of coke, 500,000 tons of heavy oils, 1,250,000 tons resin, 600,000 tons sulphate of ammonia, and 250,000 tons benzol would be obtained from 50 million tons, and, at the normal pre-war prices, would value 2,221,-250,000f.

In addition to the advantages to be derived therefrom by industry, such a production of sulphate of ammonia, in conjunction with the potash of Alsace, would produce the quantity imported annually by France before the war. Every acre of ground could be cultivated.

Among those who proceeded to Pittsburgh to attend the opening ceremonies of the U.S. Bureau of Mines on the 29th September were Messrs. McLeish and Chambers, and it was expected that Mr. B. F. Haanel of the Mines Branch would also be present at the proceedings and the Safety First meeting that follows.

THE DESIRABILITY FOR STANDARDIZING MINE RESCUE TRAINING AND PLAN FOR SAME.

by D. J. Parker, U. S. Bureau of Mines.

The modern mine rescue breathing apparatus is a self-contained device, the function of which is to permit the wearer to penetrate irrespirable gases formed by mine fires or mine explosions.

There are several types of breathing apparatus, one of which depends on liquid air for the breathing supply, a second depends upon the generation of oxygen from a chemical compound, a third depends upon normal air under pressure, and a fourth, which is most widely known in America, depends upon pure oxygen under high pressure for its air supply.

The history of breathing apparatus dates from the yar 1868, when a device was used similar to the submarine diver's helmet. Practically all succeeding forms were built along similar lines until 1896, when the present portable self-contained type was devised and used abroad. The first self-contained apparatus to be used in the United States were four sets imported in 1907 by the Anaconda Copper Mining Company of Butte, Montana. In September, 1908, breathing apparatus was purchased by the Technological Branch of the United States Geological Survey, for use in mine rescue and recovery work, which at that time was in charge of that branch.

Today the Bureau of Mines has ten rescue cars, five rescue trucks, and eight safety stations distributed throughout the mining regions of the United States, equipped with some 300 complete sets of such apparatus, while several thousand sets are owned by State mining departments and mining companies having rescue crews trained in their use.

Breathing apparatus may be divided into two types as regards the length of time the apparatus will furnish pure air on one charging; these are the half-hour type, principally used on vessels or where men are only exposed to dangerous atmospheres for short periods of time, and the two-hour type which is the kind used in mines. In mine rescue and recovery work the apparatus wearer may have to travel considerable distances from his base and two hours has been adapted as the maximum period of service compatible with lightness and convenience of portability. Only the two-hour type is considered in this paper.

In the United States there has been a steady growth in the use of breathing apparatus by the mining industry. As with many other new devices when they first appear mine operators and owners were at first decidedly skeptical as to the merits of the apparatus. However, owing to the progressive spirit of numerous operators, both coal and metal, the ingenuity of apparatus manufacturers, and persistent effort of the Bureau of Mines, a more intelligent understanding of the use and limitations of the apparatus has been attained.

As a result of the combined efforts of those appreciating the necessity for such a device penetrating

New Laboratory of the U. S. Bureau of Mines opened for the Research Work in Mine Safety, 29th September 1919.

noxious atmospheres, a tremendous impetus has been given to its use in the mining industry, especially within the last three or four years.

I believe that all of you will agree that the apparatus occupies an essential and permanent position in the mining industry, so it does not seem necessary at this time to point out instances where lives have been saved directly by the use of the apparatus, or to give even approximately the figures showing the value of the vast amount of property saved to the nation annually.

Today there is not a mining district in the United States that cannot on short notice in time of disaster obtain the services of trained men equipped with apparatus either from State or privately owned rescue stations or from the Bureau of Mines. Also, most of the larier companies have rescue equipment and organized safety crews.

On account of the constantly increasing demand for apparatus training, the Bureau of Mines has for some time appreciated the necessity for standardized course of such training.

Thorough and systematic training are essential to insure the safe and economic use of the apparatus. Such training can best be insured through standardization of training methods. As a result of a standardized course, it is believed that more attention will be paid to the selection of the proper type of men for rescue crews, efficiency will be increased, and higher appreciation of the value of the apparatus will result.

The reasons for standardization are, in fact, so obvious that it hardly seems necessary to dwell further on this phase of the subject. It might be mentioned, however, that there are two essential reasons, in addition to those already mentioned, for such standardization.

(1) It is policy of the Bureau of Mines, upon request, to give a thorough examination to men trained either at privately or State-owned rescue stations, with a view of qualifying them for mine rescue certificates as issued by the Federal Government. A standard course of training would most assuredly be tremendously advantageous to both the examiner and the examined.

(2) Trained men going from one mine to another mine would be decidedly at a disadvantage when called upon to wear apparatus, assuming that the men at each mine had received a different course of instruction. This would hold true even though their training had been with the same type of apparatus. As an illustration, it has been known to occur that where one instructor would require vacuation of the apparatus of all normal air, another would require the inflation of the breathing bag with exhaled air, while another would permit the wearer to don the same type of apparatus containing normal air. Such diversity of instruction may result in serious difficulty for the wearer.

It is believed that a course similar to that pursued by the Bureau of Mines in the standardization of first-aid instruction should be followed in this case, i. e., by the wide dissemination of a publication on the subject.

I will now attempt, without going into details, to give a few of the fundamental principles that might form a basis for such a publication.

On account of the extremely hazardous work of wearing rescue apparatus in deadly atmospheres, too much attention cannot be given to the selection of an apparatus and the training of the wearer.

Many of us are inclined to think of a course in apparatus training as so many hours under oxygen in an irrespirable atmosphere. In reality, this phase of the course, though essential, is second in importance to a thorough and scientific knowledge of the use and the mechanical and physiological limitations of the apparatus.

No one should be accepted for training without first receiving a thorough physical examination by a competent physician or surgeon.

The length of the course should not be less than five periods of four hours each. At least eight hours should be spent under oxygen and in an irrespirible atmosphere. Wherever possible the apparatus work should be given underground. The course should include standard lectures on each of the several types of apparatus now in use in this country. Such lectures should dwell at length on the verious tests of the apparatus, in order that the wearer may know to a certainty that his apparatus is functioning properly before entering a zone of poisonous gases. A person to be skilled in the use of apparatus should not only have a thorough knowledge of the use and care of the apparatus and oxygen pump, but he must also have a working knowledge of mine gases, that is, he should be familiar with their methods of occurrence, physical properties, effects on man, and methods of testing for their presence, particularly those gases encountered after mine fires and explosions. Knowledge of at least two types of flame safety lamps is desirable on the part of the apparatus man trained for work in coal mines. This is not so essential in the training of metal miners. The standardized course should specify the purity and method of manufacture of oxygen to be used in the apparatus. Oxygen manufactured by the electrolytic process may contain a certain percentage of hydrogen. The Bureau of Mines has, therefore, tentatively specified to manufacturers who supply oxygen for use in mine rescue apparatus, that the oxygen shall not contain more than 2.5 per cent nitrogen nor more than 0.2 per cent hydrogen. Also the purity of the regenerating material should be specified.

In addition, the course should deal at some length with the method of procedure following mine fires and explosions, including the duties of the captain of the rescue squad.

Publication regarding such course of standardization is now contemplated by the Bureau of Mines.

The necessity for such standardization is now, I believe, universally recognized among the manufacturers and users of breathing apparatus. By the whole hearted cooperation of apparatus manufacturers, safety engineers and the mining public, such standardized training will be established and oxygen breathing apparatus made a safer and more efficient agent for the help of mine owner and miner in times of trouble and disaster.

An address delivered at the Eighth Annual Safety congress, National Safety Council, Cleveland, Ohio, by D. J. Parker, Mine Safety Engineer of the U. S. Bureau of Mines.

Special Correspondence

BRITISH COLUMBIA.

Victoria, B. C.

The possibility of an iron and steel industry being established in British Columbia has been the subject of animated discussion since the publication of the report that large and rich deposits of limonite have been located in the Whitewate River District, some distance from the town of Lillocet, B. C. J. H. Hawthornthwaite, M. P., who is interested in the properties and who made a trip into the Interior to inspect them, goes so far as to say that there are now assured to this Province "blast furnaces, rolling mills and all other necessary accessories to the operation of a great steel plant." Mr. Hawthornthwaite, with whom were competent engineers, gives it as his belief that the region lying between the Klino on the north of the Chilco Lake on the south, a distance of nearly one hundred miles, contains the largest known exposure of iron ore. He says that such a large deposit of high grade iron ore, including hematite, limonite, and ironstone, cannot remain unused for long. Small mountain ranges, he says, can be seen in all directions which are literally clothed with iron from the summits down to far below the timber line. As to transportation he explains that a comparatively short spur line would furnish connection with the Pacific Great Eastern Railway, and thus provide a ready means of access to the coast. While Mr. Hawthornthwaite would like to see the Provincial Government take hold of the property, develop it, and back financially the launching of a steel industry he declares that "no difficulty whatsoever will be experienced in commencing operations at once by the introduction of outside capital. "If the same energy is displayed, "continues this member of the Provincial Legislature" in prosecuting this enterprise as was expended in carrying on the war it should be possible to have the project well underway within thirty days. Where the rolling mills and subsidiary plants will be placed is, of course, a matter for careful discussion and investigation. But I am of the opinion that there can be no question that Ladysmith offers an ideal location for the establishment of blast furnaces. Two great corporations are engaged in that neighborhood in mining the finest coke producing coal to be found on the Pacific Coast. A coking plant in connection with these mines could be readily and economically established which, together with the blast furnaces, would provide labor for several thousand men. Thus would a long step be taken towards solving one of the problems that Vancouver Island, as well as the rest of the Province, will have to meet sooner or later.

The Nanoose Collieries Company, of which J. J. Grant is the managing director, owners and operators of the Grant Mine at Nanoose Bay, have sold their interests to the Nanoose-Wellington Coal Company, of which Lewis Williams, of Seattle, Wn., is president and with whom are associated other Washington State and St. Paul Capitalists. The property comprises approximately 1,700 acres, including submarine area, and it is the intention of the new owners, according to Mr. Williams, to immediately start operations to the end that the output may be largely increased. Construction work is to commence without delay, plans already being underway for new bunkers, a washer and other top equipment. Surface improvements and underground development will mean an expenditure of at least $100,000. The object said to be aimed at is to bring the daily production up to 500 tons as quickly as possible. John John, superintendent under the former owners, has been retained in the same position.

Stewart, B. C.

Sir Donald Mann, owner of the Big Missouri Group of Claims, in the Salmon River District, Portland Canal, which property is to be diamond drilled, is paying another visit , the second in six weeks, to the part of northern British Columbia in the mineral development of which he is so keenly interested. Coincident with Sid Donald's arrival there are many rumors of possible development, one of which refers to the construction of railroad from Stewart to the Big Missouri, which ambitious project is justified on the ground that an important discovery of gold-silver ore has been made on the Laura and E Pluribus Claims. Professor Bancroft, of McGill University, Montreal, recently left to inspect the Big Missouri and other claims in the district while F. H. Minard, of New York, ocnsulting engineer Sir Donald Mann, also is making an inspection of the pormer property.

Boyle Bros., diamond drill contractors, have started work on the property of the Forty-Nine Mining Co., Salmon River. The same company had taken a third drill into that section for work on a property, the name of which is not given. Boyle Bros. have the contract for drilling the Big Missouri.

P. Welch, of the John W. Stewart Contracting Co. and the Foley, Welch and Stewart interests, accompanied by his son, Lieut. J. A. Welch, of Spokane, Wn., has gone into the Salmon River Country to inspect the Mineral Hill Property. With the party were R. W. Martin and H. J. Fetters, who also are interested in the property, and Al. Harris, superintedent of development work.

Kaslo, B. C.

The equipment of the Silver Bell and Silver Bear Mines, situated on the south fork of Kaslo Creek, is being improved, a number of houses for the accommodation of the men having been completed. These silver-lead properties are being worked under the direction of W. E. Newton, mining engineer. They are controlled by R. F. Green, M. P., with whom is associated his brother, S. H. Green, of Kaslo, so far as the Silver Bell is concerned, and in association with Senator Clide Pringle, of Ottawa, in respect of the Silver Bear. The Silver Bell recently shipped a carload of rich ore to the Trail Smelter and ore still is being sacked from the upper workings of equally high grade, development proceeding simultaneously. The Silver Bear is being opened up and is reported to be showing promise.

Recoveries from the concentrator of the Cork-Province Mine, situated on the south fork of Kaslo Creek, have been running 51 ounces of silver and 67 per cent lead per ton of ore treated. A shipment of four cars of concentrates is being made to the Trail Smelter. Previous shipments made this year totalled 122 tons. The production of this property last year was 642 tons of lead-silver concentrates and 110 tons of zinc-silver concentrates.

F. J. Edwards, manager of the Index Mine on the south fork of Kaslo Creek, states that the installation of an air compressor at the Mine is complete and that two drills are in operation. Both machine and hand work is in progress. A long crosscut is being driven to No. 2 vein while a drift is being made on No. 1 vein from the intersection of the crosscut. Silver-lead is the chief content of the ore.

Merritt, B. C.

Joseph T. Knapp, who is in charge of development work at the Donohoe Mine, Stump Lake, reports that the work of unwatering the Josphua Shaft is making good progress and that active mining operations will be started as soon as the 200-foot level has been emptied. Air compressors are on their way and a new motor truck has been purchased to transport ore to the railway at Nicola. Mr. Knapp states that it is planned driving a long tunnel to crossécut the several planned driving a long tunnel to crosscut the several veins of the property. When it reaches the Joshua vein it will be some 1200 feet in length, cutting the latter at a depth of about 550 feet. It is expected that the tunnel will cut the Tubal Cain Vein at a distance of about 500 feet in and another, known to exist between that point and the Josphua vein. The Donohoe Mine ore contains values in gold, silver, lead and copper, its chief content value being in silver.

Alice Arm, B. C.

The Taylor Engineering Company is planning the erection of a 3,000 tons ore bunker at the wharf at Alice Arm to facilitate shipping. The railway is transporting 150 tons of ore a day from the Dolly Varden Mines to tidewater.

The Sweetwater Claim, situated across the river from the Dolly Varden, has been purchased by D. J. Hancock, who is interested in a number of other claims in the district. Mr. Hancock recently announced that all right, title and interest in the United Metals Company had been sold to him for $25,000 and that the only interest the stock-holders have remaining is the division of such moneys as has been and is to be paid by him on the property.

The La Rose Mine is taking out some good silver ore, two shipments having been made, one to Anyox and the other to the Trail Smelter.

Samples taken from the Climax Claim is reported to have assayed high in silver while rich ore of the same character is said to have been taken from the North Star Mine.

Barkerville, B. C.

For years E. E. Armstrong and other Cariboo prospectors have been searching for the motherlode which fed the placers of that district, from which many millions in gold were taken over fifty years ago. In the last year or so the quest resulted in discoveries of importance two quartz ledges being uncovered and traced for a distance of nearly 20 miles, the strike being northwest by southeast. Mr. Armstrong and his associates, F. J. Tregillus, J. H. Blair, and Pat Carey, prospected these ledges which are respectively 17 feet and 42 feet in width. Assays run from $17.50 to $19.00, while as high as $500 to the ton has been obtained. For a depth of 20 to 30 feet the ledge matter is much decomposed and the gold is free. By grinding a piece of the rock in a mortar and panning the powder fine gold is readily recovered in the decomposed material. Below that depth the ore tuns base and will have to be either concentrated and smelted or cyanided. No great depth has been achieved on the ledge, about 30 feet in one shaft being the greatest, but it will be prospected at depth and crosscut and tunnelled during the coming months on a large scale. Recently a deal was concluded by which eight claims were turned over for $250,000, the purchasers being Robert & Bryce, M. E., of Toronto, Ont. and associates, the former now being in the district with A. W. Newberry making preparations to commence work. Mr. Bryce already has located water and mill sites and a stamp mill will be installed next Spring for treating the free-milling ore. In addition to the claims involved probably 20 others have been staked along the zone.

Nelson, B. C.

As a result of a statement that the Canadian Consolidated Mining and Smelting Company of Trail, B. C. has been selling its lead at a low price to a subsidiary concern, thus treating the independent ore shippers unfairly inasmuch as all the lead produced at the smelter is pooled and sold in the best market, particulars have been given to Fred. A. Starkey, commissioners of the Associated Board of Trade of Eastern British Columbia, by the Company of what happened to the 205 lead shipments made during the months of April, May, June and July. For each of these bulk shipments the Company has made a tabulation giving the sale number, advice number, lot number, car number, weight in pounds, price per pound, amount of invoice, name of consignment and destination.

An analysis of the shipments made with reference to the consignees shows that the smelter had 21 customers during the four month period of whom nine received shipments in April, eight in May, fifteen in June, and eleven in July. Twenty of these customers were Canadian firms and one was American. The last named, the Pacific Orient Company, of San Francisco, received seventeen consignments in June for export, this being the only month in which it figured.

The five largest customers were: The Carter White Lead Company of Montreal, 50 shipments; The Northern Electric Co., of Montreal, 40 shipments; The Canada Metal Company, of Montreal, Toronto, Winnipeg and Vancouver, 25 shipments; Jas. Robertson & Co., of Montreal, Toronto and Winnipeg, 16 shipments; and the Steel Company of Canada, of Atwater and Montreal, 12 shipments. The other fifteen customers averages three shipments each, the destinations including, besides the cities named, St. Johns, Sherbrooke, Quebec, Hamilton, and Walkerville.

The average price for April was 5,452 cents per pound; May, 5.579; June, 5,556; July, 6,084. Shipments for the four months reduced to tons were: April, 675 tons; May, 1,456 tons; June, 3,278 tons; July, 1,334 tons.

A comparison between the New York prices and the prices that the smelter obtained shows that the Canadian purchasers of pig lead paid, and the lead ore shippers of the district received settlement at, a considerable premium over New York. This is shown by the following table:

Month.	New York	Average Sales of Consolidated
April	5	5.45
May	5.04	5.58
June	5.26	5.56
July	5.23	5.67

Thus, on the average, the Canadian shipper has received for his lead content, 44 cents more per hundredweight, or $8.80 per ton, during the four months, than the American shipper. But for the necessity of meeting the competition offered by cheap Mexican lead, and preserving the home market for the future, it is intimated that the advantage of price would be still greater.

On the upper part of Cascade Creek there are located the Comstock and Whitewater Groups of Mineral Claims, belonging to the Nelson Mining & Development Co., the E. & M. Mine, operated by P. Sheran, of Nelson, as well as other properties. This region was visited recently by A. G. Langley, Government Mining Engineer for the East Kootenay District, with a view to reporting on the prospects referred to and on an application from those interested that the government assist in the construction of a mining trail to the shipping point, namely, Bosworth, Trout Lake. The mining men claim that this will give them a shorter route with an easier grade and that the facilitate will very materially assist them. Mr. Langley visited the properties on which work is underway and it is reported that on the E. & M. a cross-cut now is more than 250 feet in, being well past the centre line of the boar's back on which the claims are situated. Less than 50 feet more is estimated as sufficient to cross-cut the nearer of the two parallel inclined veins, both of which were exposed in the 40-feet shaft which constituted the first development.

John McIntyre, of Fairview, B. C., a well-known prospector, has staked a silver claim within the limits of the municipality of the City of Nelson. This recalls to those who have reported the occurrence the early days when Nelson consisted of nothing more than a shack and two tents.

The road to the second Relief Mine is being restored. It was burned over on July 16. There are three bridges to be rebuilt.

The 6,000 foot wagon road being built from the California Mine to the Athabasca Mill by the California Mining Co., is through to the mine, although the work is not quite complete. The company propose employing motor trucks for the transport of the ore to the mill.

Trail, B. C.

Ore receipts in gross tons for the week from August 21 to 31 inclusive at the Canadian Consolidated Mining & Smelting Company's smelter, Trail, B.C., were 11,551. The largest shipment from any property, independent of those belonging to the company, came from the Mandy, of the Pas, Manitoba, with 1023 tons. There were no other large shipments from the independent operators but of the company's mines the Sullivan, Kimberley, contributed 7,467 tons and the Centre Star, of Rossland, 1,804 tons.

Ore receipts in gross tons for the week from Sept. 1st to Sept. 7th, 1919, inclusive, received for treatment at the smelter of the Canadian Consolidated Mining and Smelting Company, Trail, B. C., totalled 6,610, making the total tonnage handled to date this year 241,148. The largest independent shipper again was the Mandy, Le Pas, Manitoba, with 571 tons while the Quilp, of Washington State, was a close second with 442 tons. The Company's mines, of course, were heavy shippers. From the centre Star, Rossland, came 1687 tons and from the Sullivan, Kimberley, 2720 tons. The Sullivan Mine has passed the 100,000 mark for zinc ore shipments for the current year. During the same period the same mine has contributed a considerable tonnage of lead ore. A new shipper is the Silverite, of Alamo, recently taken over by Clarence Cunningham.

Greenwood, B. C.

The 100-Ton mill being installed at the Carmi Mine, situated 40 miles west of Greenwood, is making good progress. The foundations are being laid for a five drill steam compressor. This property has a showing five feet wide with an exposure of 1200 feet.

Vancouver, B. C.

Prizes were awarded competitors in the mineral exhibit of the Vancouver Exhibition, as follows:

Best exhibit of natural mineral salts, Basque Chemical Products.

For the best general exhibit of ores from any of the six mining districts—Gold medal to the Kootenay District, per Fred. A. Starkey; Silver medal, Portland Canal per Stewart Prospectors's Association.

For exhibit of ores from any mine or prospect from each of the six mining districts from which two or more exhibits are entered from separate properties in the competing district—Coast District, gold medal to the Drum Lummon Mines, Limited; Kamloops Districts, gold medal to Kathleen Groupe (Max Cameron).

Best exhibit of silver ore.—Dolly Vanden Mines.

Best exhibit of copper ore.—Drum Lummon Mines.

Best exhibit of gold ore.—Surf. Inlet Mines.

Best exhibit of copper-gold ore.—Drum Lummon Mines.

Best exhibit of copper-silver ore.—Bowena Copper Mines.

Best exhibit of products extracted from coal.—The Barratt Company.

Best exhibit of molybdenite.—Index Molybdenite Company.

Best exhibit of hand samples by individual prospector—1st, Gretna Group, Alberni District; 2nd, P. Gilboe, Spences Bridge; 3rd, McKinnon Group, Howe Sound.

Golden, B. C.

C. J. Lincke, superintendent of the Tarheel Copper Co., Limited, has imported a car-load of horses for use in mine work in the Golden district. The first use to which he will put them is the bringing out of a carload of ore, which is ready for shipment. It is expected to go 15 per cent copper. It is hoped to ship three carloads before the close of the season.

Winnipeg, Manitoba.

Of interest in British Columbia mining circles is the announcement that the Manitoba Government may built a 72 mile railway to furnish transportation facilities for the rich mines of the Pas, Manitoba. The Provincial Government, evidently, appreciates the necessity of such a work but thinks that it is the duty of the Dominion Government to take the initiative. The Canadian Pacific it is stated contemplates the construction of a line to the Pas and thence to the mining region but it is likely to be several years before this is done.—In the meantime the mines are operating under a heavy handicap, some shipping ore for smelter treatment to Trail, B. C., and handling it several times en route.

NORTHERN ONTARIO.

The Gold Mines.

Position of Hollinger Consolidated sufficiently good not to require exaggeration.

The "Financial Post," Toronto, in a recent issue contains information which does not find corroboration in actual facts. It says, regarding the Hollinger Consolidated: "Hollinger, it is said, will increase its "dividend rate from one per cent a month to five per "cent quarterly at the turn of the year. There is about "$5,000,000 in the company's cash reserve, and it is "likely that a substantial part of this will be divided "among shareholders in the shape of a bonus around "Christmas time. The shares are selling between $6.50 "and $7 now and there is said to be a pool working "to get control of all the stock available. The ore re- "serves of the Hollinger property are estimated by the "company's engineer at $50,000,000, while other min- "ing men say that $80,000,000 would be a conservative "estimate."

The actual facts are these: Hollinger surplus as of June 17th, last, was officially stated to be $2,853,043.92. Of this $781,756.91 was added during the first half of this year. The indications appear to be that the surplus may exceed $3,500,000 by the end of this year. Dividends are not being disbursed at the rate of one per cent a month. A disbursement of one per cent is made every eight weeks. The ore reserves have never been officially estimated at $50,000,000, the official estimate at the beginning of the year was a little over $41,000,000. Further, if other mining men estimate ore at $80,000,000 such an estimate is not to be relied upon. The estimates of the management have always been found to be exceedingly reliable.

The Hollinger Consolidated has taken its place as the leading gold mine in the Western Hemisphere, and appears about to make a strong bid for world leadership. It would seem a pity were ridiculous statements to get abroad that might confuse the actual strong physical condition of the mine and the conservative policy of the company with claims that are at once irresponsible and not true.

The Dome's Position.

The Dome Mines had close to ten million dollars in ore blocked out as of March 31st, last. The gold content of the ore is estimated to contain between $5 and $6 to the ton, the 1918 figures being $5.10 to the ton. The milling equipment is adequate to treat an average of about 40,000 tons monthly, or at the rate of approximately half a million tons annually. It is therefore evident that ore already in sight is sufficient on which to operate present milling equipment at full blast for a period of four years. This estimate takes into consideration the ore blocked out above the 700-ft. level. All that zone lying below the 700 and down to a depth of close to a quarter of a mile is omitted from the estimate for the reason that although sinking has been carried down to that depth, yet sufficient lateral work does not appear to have been done to determine the volume of the ore. The Dome is the second largest gold mine in Canada, being second only to the Hollinger Consolidated. Operating at full blast it should produce at an average of not far under a quarter of a million dollars a month, or perhaps close to three million a year. The company is capitalized at 500,000 shares of the par value of $10 each. Some 400,000 shares, or $4,000,000, have been issued. The indicated output, therefore, is close to seventy-five per cent of the issued capital. Allowing two- thirds to be consumed in costs, the remaining one-third would represent about twenty-five per cent net profit on the company's issued capital.

The McIntyre Report.

The recently issued annual report of McIntyre Porcupine Mines, Ltd., covering the year ending June 30, 1919, is of more than ordinary interest. Developments at the mine during the year resulted in the opening up of very large bodies of ore of good grade. There have been numerous reports and rumors concerning these developments and it was generally known that the ore deposits were proving to be better at depth than near the surface. The official statement shows that these favorable reports were well founded.

Manager Ennis presents a report that should delight the shareholders and at the same time increase the faith of the public in the mineral resources of Ontario. The development of No. 5 vein on the 1,125-ft. level of the McIntyre is an event of great importance in the history of gold mining in the Porcupine area. When Mr. Ennis made his report the vein had been opened up 900 ft. and showed an average width of 9.5 ft. and assayed $18 per ton. If such ore extends even a short distance below the drift it will yield a very large tonnage of ore that can be mined at a profit of about $12 per ton. If such ore continued to the 1,250-ft. level there would be in this small section of the vein 90,000 tons that would contain $1,620,000 in gold that could be recovered at a profit of over $1,000,000. With such possibilities ahead, and with the demonstrated facts concerning the ore above the 1,125-ft. level, the operators can well look hopefully to the future.

The ore reserves as of June 30th were estimated at 433,057 tons, containing $4,777,324, the assay value of the ore being estimated at $11 per ton. Assuming operating costs to be about $5 per ton, this ore should yield a profit of roughly $2,500,000. There is very little said in the report as to the exact location of this estimated ore, and there are no stope maps with the report. The estimate can mean little therefore, except supplies, 12 cents; power, 22 cents; timbering, 18 contained in the report. It seems probable, however, that the company's biggest asset is the ore of unknown value—the yet undeveloped ore. The really important information given in the report is Manager Ennis's statement that "the 1,125-ft. level is opening up in a very satisfactory manner, showing a more continuous length, width and average grade of ore than any previous level opened up in the property."

Operating costs at McIntyre mine.—The McIntyre produced in the year ended June 30, 1919, 179,874 tons ore of which the gross value was $1,755,059. The operating expenses totalled $914,779. The average value per ton was $9.76, and the average cost $5.09 per ton.

The cost of mining the ore was $2.89 per ton, including 82 cents for development and 5 cents for exploration. Crushing and concentration cost 16 cents; milling, $1.01; repairs to buildings, etc., 6 cents; heating, lighting, etc., 27 cents; head office, 22 cents; mine office, 19 cents; taxes, insurance and workmen's compensation, 22 cents; marketing bullion, 4.6 cents, and examination of prospects 1.6 cents.

Mining costs.—An analysis of the mining costs shows that the labor cost $1.14 per ton; explosives, 38 cents; supplies, 12 cents; power, 22 cents; workshops, 1.3

cents; rock drill maintenance, 6 cents; workshops, 1.3 cents; hoisting, 35 cents; sharpening steel, 8 cents; pumping and ventilating, 9 cents; assaying and sampling, 7 cents; superintendence, 4 cents; surveying and engineering, 6 cents, and general charges 1.2 cents.

Milling costs.—An analysis of milling costs shows that labor cost 20 cents per ton; supplies, 61 cents; power, 17 cents, and workshops, 3 cents.

The cost per ton for crushing and elevating was 2.5 cents; ball mills, 19 cents; classifiers and tube mills, 19 cents; reagents, 19 cents; agitators, 5.6 cents; thickeners, 3 cents; clarification, 3 cents; precipitation, 15 cents; pumping and elevating, 3 cents; refining, 9 cents, and assaying, 1.5 cents.

The mill treated 179,874 tons ore during the year. The recovery was 95.2 per cent.

The McIntyre shaft.—Results at depth are so encouraging at the McIntyre mine that it is proposed to proceed steadily during the coming year with the sinking of the main shaft, which has now reached a depth of over 1,400 ft. Levels will be established at each 125 ft. Stations have been cut at 1,125, 1,250 and 1,375 ft. Ore and waste pockets will be cut at the 1,375 ft. level and a haulage level established to handle the ore from ore passes raised to the 1,250 and 1,125 ft. levels.

More Hollingers.—Mr. A. F. Brigham, manager of Hollinger Consolidated Mines, is optimistic as to the future of gold mining in Northern Ontario. Mr. M. O. Hammond of the Toronto "Globe" quotes him as saying: "A country covered with bush and muskeg like this, that has one Hollinger on it, has every chance of having several more Hollingers."

There is much more bush than muskeg in Ontario gold areas, but we agree with the idea conveyed in Mr. Brigham's remarks. The Hollinger out-crops are inconspicuous enough now that the forest has been cleared, but the place where the Hollinger buildings now stand was ten years ago a "dirty bit of tangled forest." Where the stamps now roar almost unceasingly there was little to attract the prospector. Fortunately, gold quartz was found and the great Hollinger mine has taken the place of an uninviting tract of the forest.

When one considers that only a very small part of rock surface is exposed, it is easy to agree with Mr. Brigham that there may be many more Hollingers yet undiscovered.

Developing gold at depth.—There is much encouragement for Ontario gold mine operators in the recently issued report of the manager of the McIntyre mine. At the lowest level, 1,125 ft., there has been developed the best and biggest stretch of ore yet opened in the mine.

This announcement is not only of interest to shareholders of the McIntyre. It is of importance to all who operate gold mines in the Pre-Cambrian areas of Ontario. There has been too much pessimism as to the downward extension of Ontario gold deposits. There is no sound reason for the frequently quoted "surface enrichment" so far as our glaciated Pre-Cambrian areas are concerned. The present surface should be taken as a fairly representative horizontal section of deposits that may continue to great depth.

Men needed at gold mines.—While good progress is being made at the big gold mines of the Porcupine area, there is still reported to be a shortage of miners at the Hollinger and Dome mines. Several hundred additional men could be used to advantage at these properties.

Prospecting Kirkland Lake area.—Mr. Percy E. Hopkins of the Ontario Bureau of Mines, who has been until recently working in the Kirkland Lake area, states that a good deal of prospecting has been done this summer. There are more prospectors at work in the area than for several years. Mr. Hopkins and Mr. A. G. Burrows are making a detailed geological map of the area. Mr. Hopkins is now at the Shiningtree area and Mr. Burrows at Matachewan, but both will return to Kirkland Lake area soon. Mr. Burrows will first visit the Gowganda area.

THE SILVER MINES.

All Leading Mines Again Operating at Cobalt.

The Nipissing mine resumed production Sept. 24th. This makes it possible to state that the leading mines of the camp are once more fully operating. The recovery from a camp closed and partially flooded mines at the end of the first week of September, to a normal state of operation before the close of the month, is a tribute to the efficiency of the managerial staffs.

Owing to the extensive underground workings of the Nipissing having been partially flooded the general impression had been that anything like normal operations would not commence before the first week in Oct. Now, as matters stand, the entire workings will be completely dewatered by about October 5th.

The Mining Corporation has again attained full capacity. A greater number of stamps are being operated today than during the period preceding the strike. This would seem to indicate a likelihood of the company being able to make up for a large part of the time lost.

At the Beaver Consolidated, operations are proceeding at capacity and marked success is stated to be resulting from development work. It is learned that considerable high grade ore is being taken out, a fair quantity running several thousand ounces to the ton.

Work for the time being is confined to between surface and a depth of about 700 feet, the latter level being in the diabase sill. For the present, no work is being done in that zone lying below the diabase sill and at a depth of between 1,600 and 1,700 feet.

The indications appear to be that the Coniagas mine will produce about 800,000 ounces of silver during the current year. The mine resumed operations at full capacity during the opening days of the second week of September and is in a physical condition to speed up production to such an extent as to almost make up for the loss of time incurred by the recent labor strike.

Production for this year bids fair to average about 67,000 ounces monthly, worth, at the present price of silver, about $75,000. It should, however, be kept in mind that during the first few months of the year the price of silver averaged about $1.01 an ounce and that production evidently averaged about $67,000 a month.

Last year the cost of producing silver averaged about 34 cents an ounce. Including all charges for marketing, etc., the total cost approximated 40 cents an ounce. Taking everything into consideration a slight increase

in the cost of production appears probable. Opinion appears to be that profits may average about 60 cents an ounce or about $480,000 for the year.

Assays taken from the new vein recently opened up at the Adanac showed a silver content of 112 ounces to the ton, according to official information. The vein continues to appear promising.

During the week ended September 26, three Cobalt companies shipped an aggregate of sixty cars containing over half a million pounds of ore. The Buffalo was the heaviest shipper. A summary follows: Buffalo, 3 cars, 291,165 pounds; McKinley-Darragh, 2 cars, 172,125 pounds; Nipissing, 1 car, 85,873 pounds. During the corresponding period the Nipissing and the Mining Corporation made heavy shipments of bullion, the Nipissing sending out considerably over a quarter of a million dollars. In addition to this the Nipissing sent out over 200,000 ounces at the end of last week. Following is a summary of this week's shipments: Nipissing, 170 bars, 225,587 ounces; Mining Corporation, 68 bars, 68,603.99 ounces. With quotations for silver not far under 1.20 an ounce the week's silver shipments from Nipissing and Mining Corporation had a value of not far under $350,000.

South Lorrain District.

Interviewed this week, a property owner in the South Lorrain district expressed himself as being quite optimistic over the outlook in that area. He emphasized the fact that the activity in South Lorrain occurred at a time when quotations for silver averaged between 50 and 60 cents an ounce as a consequence of which effort was directly almost entirely toward the mining of high grade ore. Now, however, conditions have changed. Ore that formerly would have barely paid for operating expenses would now constitute a big source of revenue. For illustration: Ore containing twenty ounces of silver to the ton would then have been worth only about $10 a ton with costs amounting to the value of the silver. Now, with silver quoted at about 114 cents an ounce such ore would be worth $22.80 a ton, about one half of which would be net profit.

The opinion was expressed that the Keeley mine even now gave evidence of probably yielding a substantial amount of low grade commercial ore, and that in due course a revival of activity appeared likely. He predicted that the next year would see added attention being directed to the area, and presented the greatly increased price of silver as his chief contention for believing that favorable results might reasonably follow.

Elk Lake News.

The Ontario government is being severely criticized for the slow progress made in building the macadam road from Elk Lake to Gowganda, Of the 28 miles, only about two miles have so far been macadamized. Prior to the past season the government has spent close to $200,000 on this road, and, at the present rate, at least an equal amount will be required to complete it

Activity in the Elk Lake field is increasing. Work at the Paragon-Hitchcock is being carried on at the 200-ft. level with more or less encouragement. It is reported locally that there are some prospects of the Beaver Consolidated again resuming work on the Beaver Auxilliary, where work was suspended at the outbreak of the war. The Kells claims on which considerable silver is showing on surface are the object of more or less competition among prospective buyers. In other directions, also, there are gathering signs of renewed activity throughout the district.

According to advice coming from the Gowganda district, a promising silver find has been made on surface at the Castle property of the Tretheway Company.

An option held for some time by Col. H. McKee and J. Auger on the Silver Alliance property near Elk Lake has been turned over to T. J. Flynn, and arrangements are to be made to carry on exploration work.

Gen. Morrison, of Ottawa, is in the Elk Lake district looking over the property of the Northern Mining Company with the object in view of making arrangements to commence exploration work in the near future.

The Ontario Government will build a road from Elk Lake to Mountain Chutes on the Montreal River, according to information just received. It is learned that the work will be of the usual kind, that of clearing and grading.

The Late Charles O'Connell.

Charles O'Connell, one of the most widely known mining engineers in Northern Ontario, died at his home in Halleybury on Saturday, last. He had been seriously ill for but one week, although suffering from heart trouble for the past several years. He was interred in the Haileybury cemetery on Tuesday.

Mr. O'Connell was one of that old school of mining engineers who in all mining operations which he managed during the past fourteen years in this country commanded the deep respect of all those in his employ. It was characteristic of him to always look at the optimistic side. To him the pessimist seemed quite out of place in the North country. Due to keen human interest shown toward his wide circle of friends, Mr. O'Connell's passing leaves a vacancy in this mining district which is regretted, yet cherished by those who at one time or another were privileged to call him their chief.

In every sense of the word he was a genuine and an invaluable pioneer. The early days of Cobalt, the first actual mining operations in the Kirkland Lake camp, and the first mining development in the Boston Creek field bear ample testimony of this.

He died at the early age of 47 years, and was buried by the Masonic Order of which he was a member in the highest standing. His wife and three children survive.

That it behooves all those who wish to offer stocks or bonds for sale in Ontario to make a careful study of the Ontario Company's Act is made exceedingly clear by Attorney General I. B. Lucas. It is pointed out by Hon. Mr. Lucas that in the past there have been many legitimate offerings of stocks and bonds, but with failure to comply with the provisions of the act as to filing prospectus and giving information in all advertisements, as required by the act. It is evident, therefore, that not only the doubtful propositions will come under the scrutiny of the authorities, but all offerings will be dealt with without any evidence of partiality. The matter is one of vital interest to a veritable army of shareholders, and appears to be meeting with the genuine approval of mining men of the north in general.

Labor Situation.

The membership of the Cobalt Miners' Union is rapidly falling off, and evident signs of lack of confidence in the present executive of the union are noticeable. The resentment of the mineworkers against the strike leaders is natural, as there was

never any doubt but that the strike call was unnecessary and was bound to result calamitously.

It is reported that the Kirkland Lake strike will continue as the result of a majority of 15 votes in a poll of 125 votes. If these figures are correct, taken in conjunction with the isolated and ill-advised nature of the strike, it is only possibly to feel sorry for those "non-combatants" on whom the brunt of the suffering will fall during the coming Winter. It is already probably too late to expect a resumption of work in this camp until next Spring even were the men to decide to resume work at once.

NOTES FROM PORT ARTHUR AND LAKE NIPIGON DISTRICT.

Mr. J. C. Bateman, of the LaRose Mine, Cobalt, has been making preliminary exploration of the old Beaver Silver Mine.

A. J. Jaskson has placed six silver claims, located near Schreiber, under option to the Mining Corporation of Canada, after an inspection by their representative Mr. Hughes. The Mining Corporation are gradually extending their investigations in this district.

The Dominion Mineral Resources Co. Limited are making good progress at Silver Creek, are planning an active winter operation.

The Nicholls Chemical Co. have re-opened their mine at North Pines, and will employ over four hundred (400) men.

Preparations are also being made by the company to open up the property at Mokoman, twenty miles west of Port Arthur, which they purchased from Bruce Morrison.

The expenditure as planned, will be considerobly over a million dollars, and will establish this immediate district as a strong factor in Iron Pyrite production.

Mr. Hitchcock, representative of Smith and Traverse of Sudbury, who have the contract for diamond drilling on the Peter Leitch iron claims, east of Lake Nipigon, has been spending a few days in Port Arthur, accompanied by Mr. A. K. Walch of Detroit who holds the option on these claims.

The preliminary diamond drilling results have been satisfactory and Mr. Walch has renewed his option, and has arranged for an extensive program of diamond drilling and exploration.

In this connectiin the development of the Nipigon for power purposes is important. At the present time the Hydro Electric Commission are engaged in the development of Cameron Falls on the Nipigon, at an expenditure of four million dollars. The power is to be transmitted to Port Arthur and Fort William and is thus made available for mining purposes in the district.

At Schreiber over three hundred claims have been staked in the last month as a result of a new gold and silver discoveries. A good deal of work is being done and a number of outside capitalists have visited the district, and secured options on promising properties.

SILVER MINING IN THE THUNDER BAY REGION.

The expected revival of silver mining in the Thunder Bay region is gradually becoming an accomplished fact. While the plans of the mining corporation have not been announced, its representatives are still securing options and conducting preliminary investigations. It is believed that within the near future they will equip two or more properties and start production. The Canadian Mineral Resources Company, Limited, with headquarters in Toronto and Winnipeg, have begun work on the Silver Creek property in the Rabbit Mountain area. In the same area, a Chicago mining operator has employed a small gang for the whole summer with most encouraging results. In the west end area, approximately fifteen miles to the southwest of the Rabbit Mountain, three groups of claims will be opened up within the next fortnight.

While the reaction has been slower than had been hoped, there seems now to be no question at all that steady progress will be made.

A significant fact is that both United States and Canadian investors are competing for control of certain sections. It is quite natural that, in the circumstances, the persons interested do not wish to encourage public announcement of their activities.

THE OUTLOOK FOR COAL EXPORTS FROM THE UNITED STATES AND CANADA.

Mr. George S. Rice, Chief of the Mining Division of the U.S. Bureau of Mines, has made the following report on the prospects of coal export business from United States' ports to Europe. In this connection what is true of the United States is also true of Canadian coal districts on the Atlantic coast, and some indication of the European demand is to be seen in the recent shipments of coal from Nova Scotia for Scandinavia, Italy, France and Holland, and the prospect that further shipments will be sent to Mediterranean ports, including the Levant.

So far as the supplying of its own requirements is concerned, the problem of the United States is not one of coal production, but primarily one of transportation. The coalfields of the United States are so vast, and so accessible that they can be developed to any extent desired, provided sufficient labour can be obtained.

The existing situation strikingly corroborates the soundness of the policy of those who developed the Montreal market for Nova Scotian coal. These pioneers of Canadian coal export perceived that cheap transportation was a deciding factor in the obtaining of entrance into foreign markets, and they provided the type of vessel most suited to large scale coal transportation. Unfortunately, the demands made on British shipping by the war nullified the endeavours of these far-seeing men, and prevented advantage being taken of the present European situation to the extent that would have been possible had shipping been earlier released from requisition.

The stronger position now occupied by the mercantile marine of the United States is a factor just as important at the present juncture as that country's ability to furnish the coal at the shipping port.

Mr. Rice's Report.

The coal situation in Europe was brought prominently before the public by a meeting of the Supreme Economic Council in London, at which a warning was given by Mr. Hoover, that Europe's coal production was 35 per cent below normal, and according to the press dispatch, Mr. Hoover stated, "That England's annual coal production has fallen from 292,000,000 tons in 1913, to 183,000,000 tons and Germany's decline is slightly greater." "Europe," he added, "at the present rate will produce 443,000,000 tons next year, while the amount needed is estimated at 614,369,000 tons." Following this meeting, shipping and fuel representa-

tives of France, Belgium and Italy conferred with Mr. Hoover in Paris, and decided to urge the Supreme Economic Council to appoint a European Coal Commission to co-ordinate the distribution of European coal, in order to avoid what threatens to be a disaster. Mr. Hoover declined to accept the permanent directorship of the Commission, stating that "he believed the problem to be strictly European, and that the situation cannot be relieved materially by the slight help which the United States can give." It is thought that Mr. Hoover wished to spur the Europeans to put forth their utmost endeavors to meet the dangerous situation.

Without fuel, the railroads cannot transport food and produce; factories are closed both because of inability to get fuel and inability to ship their product. The United States is vitally concerned in helping its principal allies, both from an economic and humanitarian standpoint, and whatever coal as can be sent, will be of the greatest benefit, and perhaps ward off disastrous conditions. Many persons of the United States, on account of the impending shortage of fuel next winter, feel it is unwise to encourage export business, but winter shortage in the United States usually is very temporary in times of peace, and except from November to February, there is ordinarily no difficulty in supplying home needs. From March to September, the bituminous mines usually work only part time. If during the slackest periods in the Appalachian fields, coal could be loaded for shipment abroad, it would both improve the financial status of these mines, and also help in the shortage abroad, which is going to continue for a long time.

The principal causes for this shortage abroad are:

(1) Strikes to improve conditions;
(2) Individual absenteeism from the mines;
(3) Shortening the hours of labor;
(4) Lowered individual effort;
(5) Shortage of mine supplies on the continent;
(6) Insufficient railroad trucks and poor train service on the continent.

The first four of these causes are due to the world-wide labor unrest which affects even the native labor in South Africa, according to a recent address of the retiring president of the South African Institution of Engineers, in which he states that in his group of mines the output per native has fallen 30 per cent since 1914. In Europe, the writer observed during his recent visit, that there is a very general feeling among the miners that they are not willing to go back to the old order of things in the matter of low salaries, housing and other conditions, this feeling is particularly acute in Great Britain.

In Great Britain, on July 16th, 1919, there went into effect the so-called Sankey award, which shortened the hours of labor from 8 to 7, not including the average time of lowering and raising the workmen, but including the time he takes in travelling to and from the working place, the mine owners contending that with the 7 hour work day, there was less than 6 hours effective work performed. While to some extent, this might be taken care of in the future, by increasing the number of employees, there are no unemployed miners at the present time, and moreover the workings which are laid out for the longwall system, would not provide places at the working faces. This with the other causes has lead to a tremendous slump in the production in Great Britain, and it is now a question of how long England will be able to supply its former export trade markets. In 1913, the exports were 77,000,000 tons (2240 lbs.). Unless there is serious restriction of home industries and consumption of coal, there will be little or no coal available for export.

In France, the fuel conditions continue serious. There is a loss of 20,000,000 tons output of the mines wrecked by the Germans, which has not been made up by imports from Germany or the Saar fields where the normal output of 17,000,000 tons per annum has been reduced to about 35 per cent by reason of less efficiency of the miners, claimed in part due to poor feeding.

It was expected that Westphalia, when peace had been made, would at once respond, and resume its former large production, but strikes and labor troubles have continued, and there is a most serious shortage of coal so that the remarkable situation is found of coal being imported from the United States to Switzerland and now going up the Rhine on barges through the great Westphalian fields. Sweden, Denmark, and The Netherlands continue to receive coal from the United States, though normally, all the Baltic ports should be supplied by English coal. France and Italy are also importing from the United States.

Great interest is now manifested in the various trade journals of the United States in the export business. The large exporting companies have their own facilities for handling the business, but many of the smaller operators are desirous of getting into this lucrative business, but the greatest difficulty arises first, in getting the allocation of ships, second, in arranging the matter of payment by the foreign consignees, and third, in agreement as to grade and quality of coal.

It would appear that one very important thing must be done,—the establishing of standardized methods of taking samples and making analyses. At the present time, the U.S. Bureau of Mines is sampling and analyzing American coal purchased by the Swiss and Holland governments. It would seem desirable that similar standardized methods should be followed in shipments to commercial foreign buyers to guarantee the quality of what they receive, owing to the very great differences in the kinds and quality of coals heretofore used abroad, as compared with those obtained from this country, and also because of the varying methods of sampling, analyzing, and the interpretation of results.

PROF. STANLEY GRAHAM GOES TO N. S. TECHNICAL COLLEGE.

Prof. Stanley Graham, graduate of the faculty of applied science, at Queen's University, who has been acting as professor of mining at Queen's during the absence of Prof. J. C. Gwillim, at the coast, for the benefit of his health, is leaving for Halifax, where he has been appointed to the department of mining, at Nova Scotia Technical School.

MINING EXPOSITION PROGRESSING IN NEW YORK.

From present indications, the International Exposition of Mining Industries will open in Grand Central Palace, New York City, on October 15. Originally, it was planned to have the opening of this permanent exchange on November 1st, but the interest manifested in it by the mining industry was so gratifying and the list of prospective exhibitors so large that the date was set for two weeks earlier, at which time most of the other permanent industrial expositions in the Palace will be inaugurated.

All of these are being staged by the Merchants' & Manufacturers' Exchange of New York, which will

operate eight large expositions on the eight upper floors of the huge structure—the largest exposition building in the world. The four lower floors will be used for short term shows of various sorts, such as the annual automobile shows, flower shows, motor boat expositions, chemical expositions, etc.

This Mining Exposition is to be one of the most advanced steps made in the industry since the war ended. It is expected that by the opening date many machines will be shown in actual operation on the floor. The exposition will occupy 50,000 square feet of space and will include a most comprehensive display of modern machinery used in the development and exploitation of metal mines, non-metal mines, and oil wells, also machinery used in the subsequent extraction, reduction or refining of the raw products by concentration, leaching, cyanidation, flotation, smelting, distillation, coking, etc.

Howard R. Ward, manager of the International Exposition of Mining Industries, has been making an extended tour through the mining centers, including all of the Colorado territory, has returned to New York City to prepare for the opening. He is being assisted by an able staff.

The Nemours Trading Corporation, of which Alfred I. du Pont is president, owns and controls the Merchants & Manufacturers Exchange of New York. It has branches in all of the leading cities of the world, consisting of 19 branch offices and 3,000 foreign selling agencies.

Visitors at the Mining Machinery Exposition will also find the other expositions in this building of considerable interest. Included among them are the International Factory Appliance Exposition, International Farm Tractor and Implement Exchange, International Machinery Exposition, International Hardware Exchange, International Exposition of Municipal Equipment, etc. The advantages of this great world trade clearing house are obvious. Manufacturers will have their exhibits side by side affording easy comparison. Interchange of ideas and the opportunity to observe what is new and improved in machinery, will be of decided benefit to all who are connected with the industry. Then too, familiarity with the implements and machinery of one industry so often leads to appreciation of their applicability to another.

The offices of the International Mining Machinery Exposition are now installed in Grand Central Palace, and all communication should be addressed there.

BRITISH IRON & STEEL INSTITUTE CONSIDERS FUEL ECONOMY.

The Iron & Steel Institute at its Autumn meeting in London on the 18th and 19th September will consider the question of fuel economy, at which the report of the Committee on Fuel and Ores will be discussed. A joint report on "Fuel Economy in Steel Works" will be presented by Dr. W. A. Bone, Sir Robert Hadfield and Mr. A. Hutchinson (representing the Fuel Economy Committee of the British Association). A report will be read from Mr. H. J. Yates on "Fuel Economy in Foundry Practice." Messrs. Cosmo Johns and L. Ennis will read a paper on "Fuel Economy in German Iron and Steel Works."

This selection of subjects is significant of the chief problem that is today before the steel industry, namely the lessening of fuel costs.

TALC AND SOAPSTONE INDUSTRY IN THE UNITED STATES.

A meeting of the talc and soapstone producers, held in New York, August 12, 1919, it was voted to form an association to be known as the Talc and Soapstone Producers Association. About 90 per cent of the producing capacity was represented at this meeting either in person or by proxy. The purposes of the association, broadly speaking, are the betterment of the industry, both technically and in a business way, and the promotion of a spirit of mutual cooperation and solidarity. An important phase of the meeting was the discussion of the need of a revision of the tariff on talc. A committee was formed to investigate the matter and take whatever action necessary. After some discussion of the objects of the association, organization, problems for investigation and similar matters, a committee on permanent organization was appointed for the purpose of drawing up a constitution and presenting plans for the future work and conduct of the association.

The production of talc in the United States has increased about 90 per cent in the last ten years. During this period the production of ground talc has increased about 115 per cent. This indicates a great expansion in the use of this grade of material, and suggests the possibilities of even greater expansion under favorable conditions. These conditions can be brought about through technical research and publicity. Over forty uses for talc are now known, of which only a few have been exploited at all extensively. The principal uses of ground talc at present are in the paper plaint, rubber, roofing, and toilet powder industries.

Technical research in the production and utilization of talc should include both field and office studies. Some of the definite problems which are worthy of investigation are suggested below:

I. Field Problems:

Study of methods of mining to produce most efficiently a clean, dry product.

Study of most efficient methods of crushing and grinding, grading and sizing to produce a pure, clean, uniform product free from grit, and of good color.

Solution of detail problems of milling, such as the economy of dryers, the use of bagging or packing machines, etc.

Study of methods of utilization of talc in consuming industries in order to determine more accurately the most suitable grades and sizes for each use.

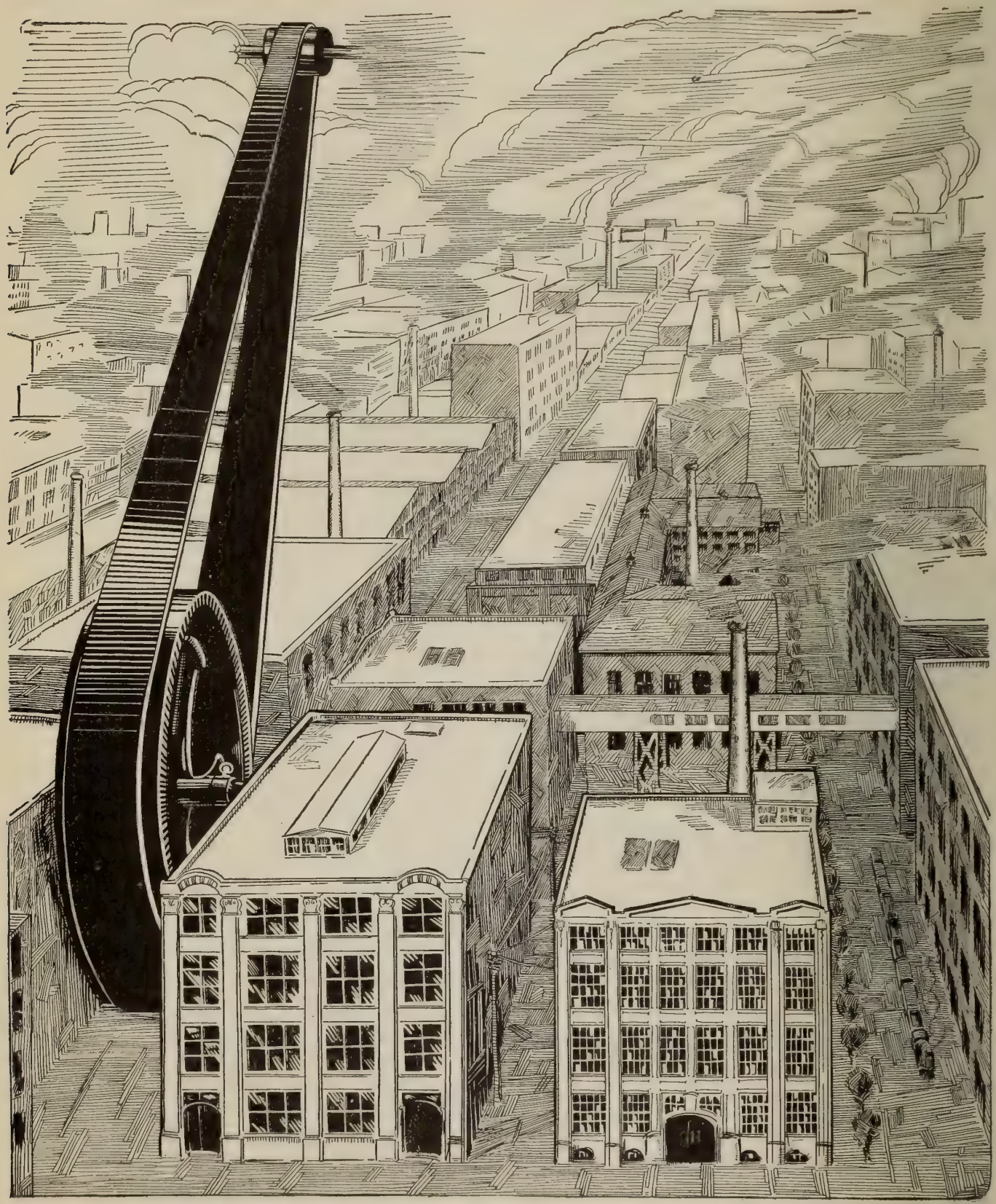
II. Laboratory Problems:

Study and tabulation of physical and chemical properties of tales from each producing district.

Study of behavior of talc in combination with other compounds in order to discover new uses: for example, a study of the colloidal properties of talc.

Standardization of grades, sizes, and tests so that uniform products may be marketed from different districts.

The solution of any or all of these problems would be of great benefit not only to the producers but to the consumers. The producers would benefit by the reduction of waste, increase of safety and efficiency, lower costs and wider markets, while the consumers would benefit by uniformity in grades and sizes and accurate knowledge upon which to base specifications and choice of the most suitable grade for each use.



EDITORIAL

QUANTITY COAL PRODUCTION IN BRITAIN COMPARED WITH THE UNITED STATES

"A dispatch from Manchester, England, "says that the repeated statement by trade "authorities that the pre-eminence of the "United States in the coal trade of the world "is due to excellence of mining machinery has "awakened the coal operators and miners of "the Manchester and Bolton districts. Elec- "trical and compressed air coal-cutting ma- "chinery, called "iron men" by the miners, "is being introduced very generally, one big "plant having recently installed an elaborate" "power plant in connection with the innova- "tion."

The foregoing, clipped from a New York coal-trade periodical, is just about the kind of information that the self-depreciative Englishmen distributes, and the United States reader will accept without gulping.

The pre-eminence of the United States in the coal trade of the world arises from the unparalleled extent and quality of its coal resources. The comparitive figures of production per man in Britain as compared with the United States which are so often quoted to prove the greater productivity of the United States' coal workers, are most misleading unless the physical conditions under which the coal is mined are also disclosed.

Coal is today being extracted in the United States under conditions more favourable than in any coal-field in any civilized country. In Britain, on the other hand, coal is being won under conditions of hardship that would in former years have been considered sufficient to prohibit profitable mining.

As to the use of coal-cutting machinery, it may be pointed out, as it has previously been pointed out in these columns, that coal is being mechanically cut and mechanically transported along the coal-face in English coal-mines today in seams that do not exceed sixteen inches in thickness.

The evolution of longwall mechanical coal-cutters and their use in thin seams is distinctively a British achievement. Compressed-air and electrically driven coal-cutters were successfully used almost thirty years ago in British mines, and British-built coal-cutting machinery has been exported all over the world, accompanied by trained users from British collieries.

In the thin anthracite seams of Pennsylvania, which are only now being attacked, men with experience gained in British mines are developing the practice.

It is also perhaps not fully realized how greatly the coalfields of the United States are indebted to British-born miners for their present development. Some years ago a collection was made of the life histories of the mine inspectors of the various coal-producing States of the Union, and the preponderance of old-countrymen was so pronounced as to be almost comical.

The members of a party from the recent Chicago meeting of the A. I. M. & M. Engineers were conducted to a coalfield not far from Chicago by a gentleman who appeared to know all about the structure of the coalfield and to have been prominent in its development, but like one of old, his speech betrayed him, and it was evident to at least one observer that the United States was not his birthplace.

The Coal Mines Regulation Act of Great Britain will not allow many of the methods which are practised in coal-mines in the United States, methods which assist materially in the cheap and plentiful production of coal. "Shooting off the solid", the use of black powder, electric-trolley haulages underground, naked lights are all to be found in United States collieries, and while we would not care to state that these practices cheapen coal production in the long run, it is quite certain that the adoption of safer methods would curtail production and increase its cost. Such natural conditions as are found for example in West Virginia, where the coal-seams crop out on the sides of rolling hills, permitting the coal to be easily entered, simplifying all problems of drainage, haulage and ventilation, are a benefaction of Nature, not granted to Britain, where today the coal must be won from deeply situated coal-seams under conditions more onerous than ever were faced by coal-miners in the world before.

Despite the vociferous claims to the contrary, British mining engineers have not been backward in the provision of modern equipment. Much of the most modern and approved practice is of British origin, and will always continue so to be, because the necessity of the British nation for coal will continue to be the mother of invention. It would be difficult to mention one basic invention in colliery practice that is not of British origin, because there coal-mining had its birth, nor has its glory yet entirely departed.

Englishmen and Scotchmen are mining coal, always from comparatively thin seams, because there are no more thick ones, at depths exceeding 3,000 feet. In many cases the colliery workings are miles under the

sea—in one case four miles. We venture to make the following statements in comparing British coal-mines with United States coal-mines, namely, that in the United States no coal is being worked from submarine areas, that no coal is being mined at depths as great as in England, that no coal-seams are being worked as thin as are being successfully mined in England and Scotland, and that coal-cutting machinery is being used in Britain under conditions not yet attempted and not even contemplated in America.

To use terms that a coal-miner will understand, the United States is filling its coal-bin from the "full-heap", while the British are producing from a "fast-end."

THE FUNCTIONS OF THE GEOLOGIST.

The following, clipped from the "Boston News Bureau" is confirmation of the correctness of the views set forth in this column in the 'Journal' of 24th. September.

> "Houghton, Mich.—Calumet & Hecla Min-
> "ing Co. has employed Professor L. C. Gra-
> "ton, geologist, to make a complete geologi-
> "cal survey of the entire territory owned or
> "controlled or managed by its mining inter-
> "ests in northern Michigan, 23,000 acres in all.
> "Geologists Lock, Polache and Burns are here
> "now, doing preliminary work."
>
> "Work was outlined by General Manager
> "MacNaughton and planned two years ago but
> "Graton had to be released for important war
> "work for the government. The job will take
> "two years.
>
> "Permission has been granted the geolog-
> "ists to examine under-ground geological con-
> "ditions at all mining properties in the dis-
> "trict as it is realized that their work will be of
> "general benefit to all."
>
> "The work will not interfere with mining
> "operations at any of the mines. Work was
> "determined from a study of the history of
> "the district and realization that every ore
> "formation in this district was found by acci-
> "dent and without proper geological reckon-
> "ing. Calumet & Hecla bears all expenses."

The management of Calumet & Hecla is to be congratulated on its foresight. We believe, however, as previously remarked, that "the rewards of research are always proportionate to the extent and concentration of effort", and while a two years reconnaissance will doubtless amply reward the Calumet & Hecla people by the results obtained, twenty years of work would yield proportionately greater results, and we do not apologise for again venturing the opinion that the reward which follows the casual employment of a consulting geologist is meagre compared to the advantages that would follow the life-long concentration of a competent geologist upon a selected property.

GROUP INSURANCE OF WORKMEN.

The Calumet & Hecla Company has insured its workmen free of cost to the workmen, and without medical examination. The amount of insurance is from $1,000 to $1,500 depending on length of service. Employees are not eligible for this free insurance until they have worked for six months, then the policy is issued for $1,000. After men have worked for five years, the policy is increased to $1,500. The insurance covers every employee, sex, age and position alike.

This is an excellent innovation, and one that might be followed with great advantage in Canada, but unfortunately, group insurance is illegal under Canadian laws. Just why it should be illegal is difficult to understand. The idea has proved very popular and successful in the United States. The general mortality tables enable the necessary premium to cover the risk to be calculated to a nicety. Underground workers, owing to a popular misconception as to their occupational hazard and general health among insurance companies, find it difficult to obtain satisfactory life insurance policies. The application of general mortality tables makes it possible to effect these group insurances, where the number of persons affected is sufficiently numerous, at much cheaper premiums than would otherwise be possible, and also makes possible the elimination of individual medical examination.

Canadian insurance law should be amended to enable these group insurances to be taken out on this side the line. Group insurance is an almost necessary supplement to a Workmen's Compensation Act. It is of course understood that it is effective only while workmen are in a given employment, and in this way a certain standard of physical fitness is attained.

HAYDEN STONE & CO. OF BOSTON REPORTED LIKELY TO ACQUIRE THE FLIN-FLON MINE, NORTHERN MANITOBA.

It is reported by the Montreal "Gazette" that Hayden Stone & Co. are contemplating immediate purchase of the Flin-Flon Mine in Northern Manitoba.

Associated with the firm will be E. C. Jackling, of New York, well known as the engineer of the Utah Copper Co. Hayden Stone and Co. control the Utah, the Nevada Consolidated, the Ray Consolidated, the Inspiration, and the Chino Copper companies. Only the final details of geological examination remain to be completed before the option is taken up and engineers are now doing this work.

WHERE THE GOLD GOES.

In the course of his speech at the opening of the Lucknow branch of the Tata Industrial Bank, Limited, in India, at the beginning of August, Mr. E. H. Ashworth, I.C.S, said that English enterprise had failed to unearth hidden hoards of wealth which lie unproductive in private hands. As an instance, he cited a case at Lucknow of family property in dispute, one item of which was 1,600 gold bricks, valued at 90,000 rupees, which apparently had laid unproductive in the coffers of the family for upwards of 20 years.

Some Notes on Ores and Rocks of Wasapika Gold Area

By REGINALD E. HORE.

In spite of transportation difficulties progress is being made in the Wasapika area. There would be greater progress if the Government made a serious attempt to build a road to the camp. The road from Westree Station to the Halfway has been greatly improved this summer, but the second half of the road is in very bad condition. The fall rains have made this section of the road practically useless, as owners of teams refuse to risk their horses on it.

At the mines the failure of the road builders is seriously felt. The operators have little doubt that a summer road will be built next year; but they regret that they should be forced to spend so much time and money on transportation when they have so much pioneer work to do on their own properties.

Recently the Ontario Bureau of Mines has sent to the Wasapika area Mr. P. E. Hopkins. Mr. Hopkins is making a geological map of an area including the Wasapika, West Tree, Herrick, Atlas, Bennett, Churchill, Wakanda, Saville, MsIntyre-McDonald, Miller-Adair, Riel-Foicey, Gold Corona and several other properties. He will later go to Shining Tree lake and map an area including the Gosselin property.

The prospectors in the area do not seem to be well supplied with literature on the ore deposits and rocks. The report made some years ago by R. B. Stewart for the Ontario Bureau of Mines and the geological report and maps made by W. A. Collins for the Geological Survey of Canada contain much useful information. It is some time since these reports were issued, however, and it would be well if Mr. Hopkins's report were published promptly. In the meantime the following notes may be of some use.

The Wasapika.—At the Wasapika mine, work has been resumed in the 100-ft. level after some delay necessitated by the timbering of the shaft. The timbering has been completed and when I last visited the property on September 19 another round had been blasted and the new face was largely vein matter. The footwall has not yet been reached, although a thick vein, about 14 ft., and numerous quartz veins, have been cut. I did not see any coarse gold in the quartz in the cross cut, but close examination of some of the quartz just hoisted resulted in the finding of small particles of gold in several pieces of ore.

When I visited the Wasapika mine a month ago the crosscut at the 100-ft. level had been driven about 40 ft. At 31 ft. it had entered a thick vein and the face was still in quartz. The vein material first broken was well mineralized with numerous pyrite crystals and occasional chalcopyrite grains. The white quartz was seamed with sericite of greenish color. Here and there in the white quartz were dark areas of an undetermined mineral. Since returning to Toronto I have examined some of this vein material microscopically. In one piece of the quartz I found a grain of native gold surrounded by a cloudy aggregate of grayish black particles. I have not yet obtained determinable specimens of the dark mineral.

These cloudy aggregates of dark particles attract attention, as they are rather conspicuous in the white quartz. Mr. Rogers gave me one specimen which shows a grain of gold visible to the naked eye. It occurs in a minute streak of the dark mineral. Microscopic examination of this specimen revealed several minute grains of gold surrounded by the dark mineral. I have had some particles of quartz containing the dark mineral tested for tellurium. The quantity of the black mineral suitable for these tests was very small, and the test not conclusive, but no tellurium was found in the material tested. Whether the dark mineral is itself of value or not remains to be determined. Its presence is of some importance in any case, owing to the fact that grains of gold occur with it. In the white quartz the aggregate of dark mineral are much more conspicuous than are the particles of gold.

The rocks encountered in the crosscut are much altered—sericitic, carbonate and pyritic. One specimen of the fine gray schist taken from the shaft showed on microscopic examination an abundance of grains of calcium-iron-magnesium carbonate. Tn this section there are numerous small feldspar crystals, much sericite, a little chlorite and some small pyrite crystals. Another specimen of finer grain and darker color was found to contain a much higher percentage of chlorite. Such rocks are common in the vicinity of gold quartz veins in the Porcupine area.

Microscopic examinations of the quartz from the Wasapika ore deposit show that it has been subject to the great strains. It has very numerous little fractures and many of the grains have been granulated or broken up into a very large number of smaller grains. Those large grains that are not granulated commonly show evidence of strain.

Many of the small fractures in the quartz have been filled with carbonate and six specimens taken from the 100-ft. crosscut all have a very large number of carbonate veinlets. In thin sections that are only one-half inch in diameter there are several such veinlets.

This evidence of great strain in the quartz is not surprising, for the outcrops shows the vein to be much crenulated as though it had been subjected to great pressure applied from north and south. The enclosing rocks have evidently yielded to the strain by flowage. The strong and more brittle vein has been much fractured and has yielded to the compression by pushing away the enclosing rocks. There is now more quartz in 100 fet. along the strike than there was originally. When the pressure was removed the vein, not being elastic, stayed in its crumpled position and the fractures that opened in the quartz were filled with carbonate. Later there has been a period of fracturing of the area under tension instead of compression and one big fracture which crosses the vein diagonally was filled by a diabase dyke.

Two of the sections of ore from the crosscut show gold grains. All the gold grains are in the quartz. They were probably there before the vein was squeezed into its present form. Many of the gold grains are in the granulated quartz areas, but some of them are in rather large quartz grains that show distinct strain shadows and which were probably there when the deformation by pressure took place.

From what I have seen of the ore deposit, I believe the gold deposition to have preceded the folding of the vein. The diabase dykes which cross this and other veins of the area are much younger than the gold deposits. The evidence of great crushing of the vein gives a clue to the nature of the finely granular dark

metallic mineral that shows rather conspicuously in places in the white quartz. This black mineral does not occur in determinable form, but as minute shapeless grains. It is possibly granulated pyrite.

The West Tree.

West Tree gold ore has been carried to all parts of the country and its spectacular character is well known. Where first opened up the deposit was extremely rich. The rich specimens were taken from narrow veins, but the ore is so rich that the samples could not fail to attract attention. However, the absence of a large body of auriferous quartz resulted in the deposit being commonly described by those who examined it as a very small one. Those who saw only a short shoot of very rich ore in a very narrow vein, near the edge of, and striking towards a lake, could not make estimates of tonnage.

My interpretation of the rich shoot is that the surface exposure is but a section across a shoot which may extend downwards for a very considerable distance under the lake. While the sheeted zone with its narrow quartz veins runs about at right angles to the shore line, there is an important sulphide zone in the enclosing rocks that intersects the quartz veins at about right angles. In the old open cut this sulphide zone is seen to be dipping steeply toward the lake. The sulphide zone is broken where the veins occur by a fault which throws the southern part a few paces towards the lake. The rich ore, so far as I can learn, came from intersections and followed the sulphide zone downwards. The old workings are now filled with water, and I have not been able to examine them. I can only venture the opinion that a very considerable quantity of very rich ore will be found if a raise is made in the sheeted zone at its intersection with the sulphide zone. Across the lake a shaft is being sunk in a similar, if not the same, sheeted zone and rich ore is being encountered in the narrow quartz veins. This ore now being developed does not approach in richness the shoot along the intersection with the sulphide zone, but it is good ore. With such ore in the shaft and a good chance of developing more of it as the shaft is deepened and in drifting across the lake in the sheeted zone, and with the probability of encountering very rich ore at the intersection with the sulphide zone, the operators have reason for confidence that the West Tree will prove a profitable venture.

Gold quartz from West Tree shaft.

Gold quartz from the West Tree shaft, while easily distinguished from that of the Wasapika vein, resembles the latter in many ways; it is white quartz, has sericitic seams and numerous small crystalls of pyrite along the seams and occasional irregular grains of chalcopyrite. The gold is more conspicuous than in the Wasapika ore and some very showy specimens are obtained. There is some carbonate with the quartz. The enclosing rocks have abundant sericite, carbonate and pyrite. Seams in the quartz and between the quartz and the rock are chiefly composed of these three minerals. Scattered through the white quartz are conspicuous elongated areas of grayish-black soft mineral that is probably one of the chlorites. Some chlorite occurs also with the sericitite in the seams, The dark chlorite areas in the white quartz are common in West Tree ore but not in the Wasapika ore.

A more important but less conspicuous characteristic of the West Tree quartz is its comparative freeness from marks of deformation by pressure. It does show strain shadows and some granulation, but it has no such fractured character as the quartz from the Wasapika mine.

The gold grains in the West Tree veins are in some instances isolated in clear white quartz. More commonly the gold occurs along seams in the quartz.

One thin section examined with a miscroscope shows a thin seam which separates an area of quartz grains from one of rather coarsely crystalline carbonate. Along this seam are a few large pyrite crystals and a group of irregular grains of chalcopyrite. Scores of grains of gold occur in a distance of one-half inch along and near the seam. Where the seam has any notable width it shows much sericite and a little chlorite. In places it is a tight seam, marked by a string of grains of gold. There are also a number of gold grains between the carbonate crystals near the seam.

Another section of the West Tree ore is chiefly quartz with a few large grains of pyrite. Well within the boundaries of a strained but unbroken grain of the quartz is a grain of gold.

In examining the gold quartz two types of occurrence are commonly found. Isolated grains of gold visible to the naked eye occur in clear white quartz. Fracture faces coated with sericite often shown minute grains of gold. Most of the gold that is easily detected occurs along well defined seams that run. roughly, in the same direction as the vein.

Well rock of quartz veins at West Tree shaft.

The rock enclosing the quartz veins at the West Tree shaft is a distinctly crystalline gray rock that weathers to a brick red color. It is liberally sprinkled with small crystals of pyrite. Pieces of the gray rock which have been exposed to the weather for a few months are mottled with red, owing to a change in color of the contained carbonate.

Traversing the gray rock are well defined white veinlets. These are mostly quartz, but contain some carbonates. When exposed the carbonates soon takes on a red color and is then more prominent. Very commonly the carbonate lies on either side of the quartz with red carbonate borders.

Microscopic examination shows the rock to be largely made up of feldspar crystals and chlorite. In the immediate vicinity of the veins there is a very large quantity of carbonate, but the original crystalline structure of the feldspars is fairly well preserved. There are numerous thin films of sericite in the rock and in some specimens the sericite forms minute seams oriented in one direction, thus giving the rock a somewhat schistose character. All the specimens from near the vein show numerous small crystals of pyrite. The rock was apparently originally a distinctly crystalline part of a thick lava flow, probably an andesite. The original ferromagnesium minerals have disappeared, but there is abundant chlorite and some opaque white areas that resemble the alteration product of titaniferous iron ore. The alteration of the ferromagnesium minerals to chlorite is common in the rocks at some distance from the veins, but the abundant carbonates and pyrite were probably introduced by solutions from the fissures which were subsequently filled with quartz.

Specimens of the rock at some distance from the shaft that are greenish in color and weather to a gray color instead of red are found on microscopic examination to be also composed largely of feldspars and chlorite. They contain some carbonate, but less than do the wall rocks of the veins and apparently the carbonate is of a different composition for it is not on the weathered surfaces.

GOVERNMENT REPORTS ON GEOLOGY OF SHININGTREE AREA.

An excellent report on the general geology of what is called by the Geological Survey "The Onaping Map Area," on the northern border of which is Shiningtree lake area, was published in 1917. It is accompanied by a geological colored map of the area, scale 4 miles to one inch, and a map of Asquith and Churchill townships, sale one mile to one inch. The report was written by W. H. Collins after he had spent several field seasons in the area. The descriptions of the rocks are excellent and prospectors will do well to read pages 33 to 50, for on these pages Mr. Collins is describing rocks that are important ones in the formations that the gold deposits occur in. At the time the area was examined there by Mr. Collins there was little opportunity to examine ore deposits or to map the formations in great detail, but a very good general description is contained in his report and maps.

In the 22nd report of the Ontario Bureau of Mines, 1913, there is on pages 233 to 237 a short report on the West Shiningtree area by Mr. R. B. Stewart. Mr. Stewart visited the area in September 1911 and returned in May 1912. He prepared an excellent sketch map of the area in which gold had been found and briefly described the following mining claims: Gosselin, Caswell, Seville, Jefferson, Bennett, Knox, McDonald-McIntyre, Moore-McDonald, McGuire and Holding.

These two reports should be in the hands of all who do prospecting or development work in the area. Mr. Collins' report can be obtained by application to the Department of Mines, Ottawa, and Mr. Stewart's by application to the Ontario Bureau of Mines, Toronto. There is now being prepared by Mr. Hopkins, of the Geological staff of the Ontario Bureau of Mines, a revised geological map of the Wasapika and Gosselin areas.

RECENT MINING INCORPORATIONS.

Ontario Feldspar, Limited, is incorporated with a capital of $100,000, head office at Toronto, with a comprehensive charter. Incorporators are E. J. Swift, Accountant, R. A. Leaker, Manufacturer's agent, and others.

Hicsha Mines of Porcupine, Limited, is incorporated as a private Ontario Company with capital of $40,000, head office Toronto to do business as miners.

International Anthracite Mines, Limited, is granted Ontario charter to carry on business as miners, wholesalers and retailers of coal, and to do a general cartage business. Head office is Toronto, and capital $200,000. Directors are provisional.

Gabrielle Mines, Limited. Incorporators: Alexander Claude Gray, manager; Ephraim Albert Pelletier, farmer; Charles Arthur Millican, engineer; Louis H. Fournier, inspector; and Frederick Rathnell McLellan, agent—all of Winnipeg. Capital $1,000,000, divided into 1,000,000 shares of $1 each. Chief place of business, Winnipeg.

Bruce Consolidated Gold Mines, Limited. Incorporators: Simon Ripstein, gentleman; Norman Cecil Tobias, broker; Alan Charles Campbell, solicitor; David Crawford, accountant, and Mary Louisa White, stenographer, all of Winnipeg. Capital $2,500,000, divided into 2,500,000 shares of $1 each. Chief place of business, Winnipeg.

The R. A. P. Gold Mining Company of Boston Creek, Limited. Incorporators: Mayne Josephine Kelley, stenographer, and May Lucretia Quillnan, company secretary, both of Niagara Falls; Cecil Alvin Louch, student-at-law; Norman Scarth Macdonnell and Gregory Sanderson Hodgson, barristers-at-law—all of Toronto. Capital $2,000,000, divided into 2,000,000 shares of $1 each. Head office, Toronto.

The Nichols Chemical Company, Northpines, Ontario, advertise that the Northern Pyrites Mines of this Company is resuming operations, and ask for applications for employment.

PERSONALS.

Major Julius M. Cohen returned from France in Command of the 319th Engineers, United States Expeditionary Force. Major Cohen was Chief Engineer of Construction, and Camp Engineer for the past year at Camp Pontanszen, Brest, France.

E. A. Ely has rejoined the staff of Mascot Copper Co., Dos Cabezos, Cochise County, Ariz.and will be engaged in special work for that Company and Central Copper Co. adjoining, for some time. He was for several years a member of the Tousley-Ely Co., mining promoters and operators of Vancouver and prior to 1912 was superintendent of Mascot Copper Co., under President T. N. McAuley.

D. H. McDougall, President of the Nova Scotia Steel Company, and also of the C. I. M. & M. leaves for England on 8th October, accompanied by Mr. W. D. Ross of Toronto and Col. Cantley of New Glasgow. Mr. McDougall expects to visit the more important coal and steel plants in Britain, France and Italy, and to inspect the iron-ore districts in Spain and in Norway and Sweden.

Mr. W. K. McNeill, Provincial Assayer, assisted by Mr. W. R. Rogers, was in charge of the Ontario Mineral Exhibit at the National Exposition of Chemical Industries held in Chicago two weeks ago. A list of the minerals shown will be published in the next number of the "Journal". The exhibit was impressive, and one visitor queried in a tone of obvious surprise: "Are **all** these minerals found in Ontario?" The answer given was more expressive than grammatical, namely: "Yes, and then some." Needless to say neither of the representatives of Ontario could have been guilty of this verbal solecism, but they stood it well.

Mr. J. B. Tyrell delivered a lecture at Winnipeg on October 2nd at the Fort Garry Hotel before the Manitoba Branch of the Canadian Mining Institute on the mineral developments and possibilities of Manitoba. It is understood that Mr. Tyrell was recently in the new mining district North of Le Pas.

In the new Government paper "Future," issued recently in England, Sir Auckland Geddes says: "Coal production is out of gear, because some miners are hunting for fairy gold—something for nothing." As a result, it is properly observed, there is a possibility of employment in all trades being reduced, and the price of food being still further raised.

NOVA SCOTIA NOTES.

Changes in Dominion Coal Colliery Managers.

Mr. Neil A. MacDonald, formerly manager of No. 21 Colliery of the Dominion Coal Company at Birch Grove, is appointed Manager of No. 11 Colliery, in place of Mr. Jas. R. McNeil, who has gone with the Nova Scotia Steel and Coal Company as Manager of the Florence Colliery of that Company.

Mr. John McIntosh, Underground Manager of No. 21 Colliery is appointed Manager. Mr. McIntosh has been U. G. Manager of No. 21 Colliery since it was opened around 1911.

Scotia Producing Large Outputs.

During October the production of the Sydney Mines collieries of the Scotia Company reached 2,600 tons per day, which is the largest single day's output since 1915. Of this tonnage the Florence Colliery contributed 1,020 tons and Princess Colliery 700 tons.

Dominion Coal September Output.

September coal output from the Glace Bay collieries was as follows:

No. 1	20719
No. 2	47657
No. 4	26052
No. 5	5986
No. 6	18284
No. 9	21944
No. 10	9163
No. 11	14146
No. 12	15671
No. 14	14880
No. 15	10328
No. 16	12609
No. 21	11682
No. 22	12519
Total	242,640

This is practically the same production as during August, and compares with 251,000 tons in September 1918. The mines were all idle on the 17th for the local peace celebration. Unusual features in this list of outputs are the small production from No. 2 Colliery and the large output from No. 11 Colliery. An inspection of the figures will show that the percentage of Phalen coal is now less than fifty per cent, and the contribution of the Emery Seam has risen to almost ten per cent. The Birch Grove Collieries, Nos. 21 and 22 maintain a remarkably steady production.

The output for October ought to be much greater, as there is a full number of working days in the month, and October is traditionally a good month for production. Also the demand for cargo and bunker coal at the piers will serve to offset the lessened demand for coking coal, and it may be anticipated also that coking operations will be resumed before long.

Dominion No. 17 Re-Opened.

Producing operations at this colliery were resumed October 2nd. As previously stated in the "Journal" this colliery is the old Victoria Mine, opened originally in 1865 and closed down by the Dominion Coal Company in 1897. Just previous to the outbreak of war the mine had been pumped out, and preparations had been made to provide it with a new permanent equipment, but shortage of labour during the war period enforced the suspension of work here. Construction on a new bankhead is commenced. Sufficient houses for the workers completed before the war, and are ready for occupancy. It is likely the mine will electrically operated, as it is situated close to the main power plant of the Company at Waterford.

BRITISH COLUMBIA COLLIERIES.

From Our Correspondent.

The coal output of British Columbia for the month of August if not definitely known as yet because of the failure of returns to be received from the Crow's Nest Pass Coal & Coke Co. and from the Granby Consolidated Mining & Smelting Co.'s collieries at Cassidys, Vancouver Island. With these exceptions the outputs of the various collieries is as follows:

Vancouver Island.

Name of Company.	Tonnages.
Canadian Western Fuel Co., Nanaimo Collieries.	49,962
Canadian Collieries (D) Ltd., Comox Collieries	35,189
Canadian Collieries (D) Ltd., Extension	18,001
Canadian Collieries, South Wellington	7,473
Pacific Coast Coal Mines, South Wellington	6,510
B.C. Coal Mining Co., East Wellington	3,127
Nanoose Collieries, Nanoose	2,134
Total	122,396

Northern, B.C.

Telkwa Collieries, Telkwa ..... 96 tons.

Nicola Valley.

Name of Company	Tonnages.
Middlesboro Collieries, Ltd.	9,017
Felming Coal & Coke Co.	2,670
Corbin Coal & Coke Co.	1,875
Princeton Collieries	1,965
Total	15,527

Figures are looked for later from the Crow's Nest Pass Field and in the meantime it may be stated that a fairly substantial output is predicted for the month of August because for the first week or more after the men returned to work it was reported that 1,000 tons was producted daily at Coal Creek and 500 tons at Michel. It will be recalled that for some months before this the mines were closed, the men being on strike. As for the Cassidy Collieries it is understood that the production will show a falling off, whether or not as a result of the Privy Council's action in upholding the lis pendens preventing the company from registering its Provincial Crown Grants, is a question over which there is some conjecture.

A feature of the visit of the Prince of Wales to Ladysmith, B.C., was the presentation to His Royal Highness by Mr. Spruston of a small piece of polished coal in a neat oak box 2x2 inches. Accompanying the piece of coal was a card with the following inscription: "Sample Coal Taken from Wellington-Extension. Presented to H.R.H. Prince of Wales at Ladysmith, B.C., Sept. 26, 1919."

Nanaimo.—The underground employes of the Canadian Western Fuel Company in mass meeting Sept. 27th, endorsed an agreement entered into between representatives of the men and the company governing the question of wages and working conditions, to continue in effect from October 1, 1919, to September 30, 1922.

The agreement was signed by the agreement committee representing the men, and G. W. Bowen, managing director, and John Hunt, representing the company. It adds the first bonus of 35c to the basic rate, leaving three bonuses, amounting in all to $1.50 per day worked, in addition to the scale of wages.

The Board of Examination appointed recently for the Province of British Columbia in accordance with the terms of recent amendments to the Coal Mines Regulation Act has announced the results of examinations held at Nanaimo, Cumberland, Fernie and Merritt on August 26th, 27th and 28th. They follow:

First class certificate: Samuel D. Wark, Ladysmith; John McDonald, Merritt.

Second class certificate: John E. Smith, of Coal Creek; George Murray, South Wellington.

Third class certificate: Alfred Davies, Mitchel; James Sneddon, Fernie; John Devlin, Nanaimo.

Mine surveyors: Thos. Wright Scott, Cumberland; Joseph P. Boyce, Nanaimo; Thomas W. Roger, Corbin; Robert McCulloch, Cumberland; W. D. Vallance, Nanaimo; and William Holsworth, Merritt.

The personnel of the Board of Examiners is George Wilkinson, Chief Inspector of Mines, chairman; M. Maird, Fernie, and James Dixon, Nanaimo.

BITUMINOUS COAL FROM ALBERTA BEING USED IN WINNIPEG.

Considerable western Canada coal is being bought in Winnipeg at the present time. This coal is found very useful, especially in the earlier part of the season when the frost is not severe, and some artificial heat is required. At the present time wood is high in price and the dealers say that Alberta coal is cheaper. It burns out to an ash and for this reason is preferable at this time to anthracite, which leaves much debris in the furnace, causing difficuty in relighting.

Eastern coal will be available this year to those who have the price and no shortage is apprehended such as was anticipated a year ago. Producers in western Canada and their able representatives in this city are seeking to encourage the burning of our own product and the railway companies are aiding this patriotic movement.

IMAGINATION.

W. Wallace Alexander, associated with the Elkins estate and a leading light in the Orpheus Club, at a campfire gathering was humorously describing his troubles at a Pennsylvania coal mine which he was seeking to put on a paying basis, according to the Philadelphia Public Ledger. The miners were getting out coal two days a week—the other five days were devoted to christenings. For every christening the whole neighborhood took a day to prepare, a day to celebrate and a day to recover. Finally the problem was solved by hiring a brass band, arranging a parade and having all the christenings take place on the same magnificent, uproarious, welkin-rending day. Who says the business man has no need for the creative imagination?

Owners of the Union Mine, Franklin Camp, near Grand Forks, have signed an option on their property to interests understood to represent the American Mining & Refining Company, the amount involved being about $300,000. The Union is one of the best known mines in the camp, having shipped several thousand tons of ore, much of which carried high value.

COAL AND HEALTH.

By Dr. C. W. Saleeby, F.R.S.E.

Back from the pellucid air of Washington and of New York, where the burning of soft coal is forbidden, to the long-detested dirt of London! We have little enough sunlight, but we use the sunlight of long-past ages, which made our coal, to obscure and defile the exiguous sunlight of to-day; while aided by artificial light, we peer over schemes for the 'sanatorium relief' of tuberculosis, despising and defeating the light of day, which is the incomparable antiseptic against that rapidly-increasing disease. Customarily, as since the beginning of the century, one waits until the first disgusting fog of November suggests that the time has come to make another public attack upon the dirt wherewith the face of London is blackened; but we cannot afford to wait until November now. For this dirt, 'matter in the wrong place,' is part of the capital wealth of our country, infinitely worse than wasted by the feeble-minded inertia with which we misuse it to our destruction. To my year-long appeals as a hygienist it now added the overwhelmingly cogent argument of national economy. Even if the crude combustion of coal did no harm, we could not afford to waste it as we do. But surely a demonstration of some of the ways in which the burning of soft coal injures health may help one's fellow citizens to modify their own domestic practice in the fashion which will help to save their own health and their country's wealth.

We are to learn that, properly considered, coal is not a fuel, but a raw material, infinitely more valuable than gold, from which fuel, among a thousand other precious things, may be extracted. If we burn it as a fuel we provide ourselves with a form of fire which, it is said, English people will never abandon, because it is so delightful to look at and sit by. But no one educate one's self in this respect, as I learned to do as a medical student many years ago, from the day on which strolling round the pathological museum of the University of Edinburgh, I came across four lungs, one the pearly-white lung of a new-born infant, another the pearly-white lung of an Eskimo; the third the dirty gray lung of a city dweller; and the fourth the back lung of a coal miner of that period. Ever since that day, when I sit beside a coal fire, I see, not the lovely glow beneath, but the ugly smoke ascending, and that spoils the picture for me. I counsel you, most aesthetic reader, to look always at the smoke of a coal fire, to consider whither it goes, to imagine it defiling the lungs of the nation's children, who should be 'Non Angli sed angeli,' and in a little while you will look upon a coal fire with disgust instead of delight.

It need only be added that even the wonderful resources of the body, such as the white blood cells or phagocytes, the cilia, or 'eye-lashes,' of the cells that line the air passages, and the filtration mechanism of the nose, fail to protect us against this pollution of the atmosphere. Against natural and ancient dangers our bodies are evolved and armed and armored by age-long adaptation, but it is too much to expect them to be equal to modern atmospheric pollution. The cilia do their best to lash the smoke particles upward, keeping the air passages clear, the phagocytes carry all they can to the glands at the roots of the lung, whence they can never emerge, and if a swab be applied to the back of any metropolitan throat, phagocytes wearily trying to dispose of smoke particles which they have picked up will be readily found. As

for the nose, we blow it and blacken our handkerchief, but even so our lungs get steadily grimier from year to year, and our lives are unquestionably shortened thereby. And all this noxious dirt is part of the nation's wealth, of which we have not nearly enough, which is nowhere being replaced, and for which hosts of men live in the bowels of the earth to extract for our advantage.

Let us try by means of verbal criticism, to throw a ray of enlightenment through the murk of this subject. We use the word fog to indicate alike the sailor's enemy at sea, and the 'London particular,' or 'pea-souper'—which appeals to a depraved sense of humor. We confound as well as choke ourselves. The sea fog is aqueous phenomenon, very serious because it obscures vision, but innocent to health. There is no harm in water as such; are bodies are more than three parts water, and all life, even the bird's or the airman's, is lived in water. The sea fog defiles nothing. We met one on the Olympic in May, off the coast of Newfoundland, and I made a point of examining my nose and mouth and linen and skin, in order to satisfy myself of the immaculate nature of pure fog. Such fog must always be where there is water. We Londoners have the irremovable Thames always with us, and will have fogs accordingly. Smoke the abominable is, in its origin, nature, and results, the very opposite of fog. The combination of the two, which is the shame of our British cities, requires a distinctive, and, if possible, ugly name of its own. The best name for the purpose, I think, is 'smog,' and my present argument is that the time has come to make an end of it. The people who say that we shall always have fogs are merely tiresome and vacuous. Of course, we shall always have fogs (unless, indeed, science learns how to dissipate them, as it surely will, for the convenience of land and marine transport); but the enemy of health is not fog, but 'smog,' made by the shameful waste of the nation's inadequate supply of coal.

The green plant the souree of all our food, thrives in and lives by sunlight. The non-green plant, such as the fungi, which include all the bacteria of disease, such as the tubercle bacillus, cannot exist in the sunlight by which the green plant lives. Sunlight feeds the green plant which feeds us; it kills the non-green plant which kills us. The Finsen light, first introduced at the London Hospital from Copenhagen by the agency of Queen Alexandra, illustrates or typifies (whatever the exact details of its action) this directly antiseptic action of sunlight. We are always looking for the best antiseptic. Direct sunlight is incomparably the best, the cheapest, the oldest, and the most natural antiseptic in the world. The destruction of day-light by our present methods of using coal is the most direct possible contribution to the survival of the tubercle bacillus for our own undoing.

Destroying the daylight we destroy ourselves. All kinds of domestic infection, beginning with tuberculosis, which is the worst, and including such things, named at random, as measles and 'spotted fever' and influenza, are further favored by whatever interferes with ventilation. 'Smog' does that, for the housewife cannot really enjoy opening her windows, not only to the air of heaven above, but to the blackness and grime which pertain to regions infernal. I will not go into the question of domestic cleanliness and domestic service here, since health is my avowed topic; but the argument for cleanliness against the pollution of the air by coal smoke needs no verbal cunning to convince.

The whole of the case against coal smoke, from the standpoint of public health, has by no means been stated above. There is much to fear, for instance, as regards its influence as an irritant in the production of external and superficial cancers. On the other hand, I do not accept at all the recent theories which connect urban smoke in any significant degree with infant mortality.

The remedy, of course, is to do what the national facts and the final arguments of chemists and engineers require, quite apart from any considerations of health. The obvious course is that which, on principle, I have followed for many years past — never buy or consume an ounce of coal, but burn gas, the convenient fuel which coal yields, instead. Any amount of nonsense has been talked about gas, and, as we are now bound by imperious necessity to practice sense in this matter, we may as well learn to talk sense, too. If the whole of the worst alleged in the interests of health against gas fires were true, as it is not, the indictment would be trivial as compared with that which I have indicated against coal smoke pollution of our air and skin and clothes and food and lungs. Of course, a gas fire needs arrangements for the removal of the products of combustion; what fire does not? There is no more difficulty about making such arrangements in the one case than in the other. Will not all the friends of cleanliness and beauty, who hate the tree trunks blackened even as far as our superb Kew Gardens, join with all the friends of hygiene and hasten the reform, which is an immense and urgently imperative piece of national economy? —The Telegraph.

SOUTH AFRICA'S DIAMOND FINDS.

Two valuable and interesting parcels of diamonds have recently been on view in Johannesburg—the one from the Aliwal North fields and the other from the Monteleo property. The first-named exhibit has been on view at the Natal Bank branch of the National Bank, and consists of 425 carats. Among the stones is a yellow octohedron of 30 carats. The Monteleo parcel is of most exquisite quality, and the bulk of it has been valued at not less than £40 per carat. The first parcel received from the Aliwal North fields was sold for £9,500 the other day.

The size and the quality of the stones were both remarkable, the parcel including a large amber-colored stone of 50 carats, while there were quite a number of others of 13 and 14 carats—beautifully clear stones and absolutely without a blemish. The total quantity was 723 carats, and the price works out at £13 a carat. Both parcels are part of a two months' find at Rouxville, on the farm Klipfontein, about eight miles from Aliwal North. Here there are four white riggers working a shaft which is now about 50 ft. deep, and in the last three months they have taken out over £20,000 worth of stones.

The place has been known to be diamond bearing since 1916, but the chief success has been won since July, 1918. From that date a total of 4,313 carats have been sold at a value of £37,259. The total takings of the last two months have been approximately £13,-815, the other portion of the parcel having been sold in Johannesburg for £4,300.

Special Correspondence

BRITISH COLUMBIA.

Geological Survey Activities During Summer in B. C.

Parties representing the Geological Survey Branch, Ottawa, have been at work in various parts of British Columbia this summer. Some of them still are in the field, although the season may now be considered practically at an end. There also was a Yukon Party under W. E. Cockfield engaged in making an examination of the silver-lead lode deposits of the Mayo Country. The results of this expedition will be awaited with considerable interest by mining men.

These parties whose activities were confined to the Province may be enumerated as follows:

Salmon River, head of Portland Canal, in charge of J. J. O'Neill, who was the geologist with the Stefansson Arctic Expedition. This is the zone in which is situated the Premier Mine and a number of prospects of much promise. It is a section which, at present, is being developed on a large scale, diamond drilling being underway on the Big Missouri and one or two other groups of claims. Mr. O'Neill's report, therefore, will be looked forward to with more than usual interest.

Cariboo Country, in charge of B. R. MacKay, who is making a geological survey of the placer gold deposits.

Pacific Great Eastern Ry. Section, between centres of Clinton and Quesnel, in charge of L. Reinecke, who is making a special examination and reports of the soda lakes of that area.

Slocan, in charge of M. F. Bancroft, who is completing a geological survey of the Slocan District started years ago. This work was almost completed by the late O. E. LeRoy, who went overseas and made the supreme sacrifice for country. The late C. W. Drysdale then took up the work but, after getting well on with it, he lost his life by drowning in the Kootenay River. His records also were lost. This occurred in 1917.

West Coast of Vancouver Island, V. Dolmage, who is making a reconnaisance of the coast line.

Brittania Area, Howe Sound, S. J. Scholfield, who is making a detailed examination and preparing a geological map of the Brittania Mineral Zone.

Bridge River Country, S. C. McCann, who also is carrying on work on which the late Mr. Drysdale was engaged at the time of his death. Mr. McCann is preparing a geological map of the section. He now is visiting the Grass Valley Section, California, for the purpose of comparing the geology and the mineralization of the Motherlode District with that on the survey of which he is employed.

Coquihalla River Section, Mr. Charles Camsell, who is in general charge of geological survey work in British Columbia and whose headquarters are at Vancouver B. C. Mr. Camsell was able to get into the field for a few weeks in order to make an examination of this country and his report will be available when the complete account of this year's activities in the Province is issued by the Geological Survey Branch, Ottawa.

THE METAL MINES.

Kimberley, B. C.

The operation of the Sullivan Mines of the Canadian Consolidated Mining & Smelting Co. are seriously hampered as a result of a strike of the metalliferous miners which was declared during the third week in September. Their demand for an increase of $1 per day in wages was not acceded to and it is estimated that opproximately 200 men walked out in proteest. The North Star Mine, owned by Messrs C. C. Thompson and J. L. McKinney, also is affected. The mine was expected to be on a shipping basis again shortly, the work of replacing that part of the plant destroyed by a recent fire having been carried through expeditiously.

Nelson, B. C.

After referring to a marked revival of the mining industry in the Slocan District recently Fred. A. Starkey, Commissioner of the Associated Boards of Trade of South Eastern British Columbia, observes that the Clarence Cunningham properties at Sandon, the Queen Bess, Wonderful and Sovereign, as well as the Idaho-Alamo Mines, are producing on a larger scale than ever before. A brief general review of mining conditions then is given as follows: "The ores from the properties mentioned are treated at the new mill at Alamo, which Mr. Cunningham erected at a cost of $250,000. The Silversmith Mines Ltd. (Slocan Star) is doing remarkably well. On the 8th. and 10th. levels large ore bodies of 120-ounce silver are now under development. At the same time steady shipments of this high grade ore are being made. The Rosebery-Surprise Properties in this section, which include the Surprise, Ivanhoe, Canadian Group, Adam Group, and Bosun, are making record productions. The ores of these properties are treated at the company's mills, which are located at Rosebery and Sandon. The Noble Five, which is owned by Hon. J. Dunsmuir, Victoria, and who recently purchased the Reco Group from J. M. Harris and associates, may be considered to be among the best properties in the Slocan. An immense expenditure has been made on the Noble Five, resulting in the showing up of large bodies of ore at a depth of 3,500 feet. The company has now under construction a mill with a capacity of 200 tons daily to handle the antictpated tonnage from the two groups of claims which comprise the Noble Five and the Reco. Rembler-Cariboo, with additional territory, is meeting with success. Ruth, another old producer, has again come to life with newly discovered ore bodies. The Payne, which has produced millions of dollars worth of ore, has today several lessees working in the lower levels, who are reported to be doing well. M. C. Monaghan and associates are developing ore on the newly-found leads on the Carbonate King and the Silver Reef, which adjoin the Washington Group. George Clark and associates also are at work on the Ocean, which they have under lease. These properties are situated around the Payne Mountain. The McAllister Group, which is under bond, recently produced for its new owners ore running high in silver. A property known as the Grenfell, which has been taken over by George Gormley and associates is reported to be showing up well. New Denver properties under active development and shipping ore are the Molly Hughes, a high-grade silver proposition; the Bosun, producing over 100 tons of ore daily; the California, at Silverton, which is under lease and mak-

ing shipments; and the Standard Silver-Lead Mines, which has a considerable crew of miners engaged on development. The Echo, Galena Farm and Hewitt Mines Ltd. are constantly under development. The Van Roi and Wakefield, owned by Clarence Cunningham, are making for the skippers class. Properties in the dry belt, which includes Slocan Lake and Slocan City District, are the Enterprise, West Mount, Republic, Evening Star, Meteor, and Black Prince. Those which have shipped recently are the Black Prince, Meteor and Enterprise, which carry ores high in silver."

Northport Wn.

The Electric Point Mining Company in the operation of its property, which is situated near Northport and close to the British Columbia boundary line, proposes moving its ore to the railroad entirely by tramways. A year ago the Company built an areal tramway from the Mine to Leadpoint, a distance of more than two miles and a survey of another is being made from Leadpoint to Wood Spur on the railroad. It is seven miles between the two latter points and three miles from Wood Spur to Northport. The first tramway eliminated a sharp descent of the mountain by means of trucks and teams, which meant expensive haulage. If the installation of the second section is decided upon it is figured that costs will be further reduced. The development of a chimney of ore opened up recently is proceeding satisfactorily. The mine now has been developed to a depth of 800 feet and a large quantity of ore is available for shipment. Shipments are being made of ore which accumulated at the bunkers before operations were temporarily suspended some months ago.

Cowichan B. C.

The opening of the Lenora Mine, Vancouver Island, is being proceeded with. G. D. B. Turner, at whose instance chiefly the work is being undertaken, has returned from New York and will remain until development is well started. Alex Meagher will have direct charge, N. A. McLean, who directed preliminary work, having left for Montana to take over the position of superintendent of the Revenue Mine, in which Mr. Turner and associates are interested.

The Manganese ore being shipped from Hill 60, Vancouver Island, to the Bilrowe Alloys Co., Tacoma Wn., is giving satisfaction, the laboratory analysis of the first car being as follows: Manganese, 54.40%, Silicia, 19.5%, Phophorus, .041%. Not less than 100 tons a week are required by the Company and while this amount is not yet being taken out, the mine equipment and camp being installed shortly will permit the handling of such an output with ease.

Vancouver B. C.

The announcement that the annual meeting of the Canadian Mining Institute will be held in Vancouver on November 26, 27, and 28 has been received with gratification by western mining men. This action is accepted as indicating that the importance of the mining industry of the Province of Alberta and British Columbia is becoming recognized throughout Canada. Dr. E. T. Hodge, professor of geology at the British Columbia University, has been appointed general secretary. He occupied a similar position in connection with the recent International Convention at Vancouver, the success of which was in no small measure due to his energy and intelligent direction. Dr. Hodge and the members of the committee of management already are engaged in the preparation of a programme which, it is hoped, will make the first meeting of the C. M. I. held in Vancouver one of the most outstanding in the organization's history.

Brittania B. C.

The attention of the mining men of the northwest has been directed to the Brittania Mining Company's operations recently because of the fact that its large and complete plant is being worked steadily at capacity with rather remarkable results. It may not be generally understood that this Company is equipped with a concentrating plant with a capacity of 2,000 tons of ore a day and has the largest mineral separation plant in Canada. The high grade ore and concentrate is shipped to Tacoma and the tailing is delivered to the beach and carried to sea by the tide. All the machinery is driven by electricity, which is generated by water power. After passing the turbine wheels water is used again in concentrating the ore. At the present time the company controls a length of twelve miles on the Brittania Geological Belt and a width of several hundred feet. During the last few years it has acquired properties from prospectors, for which it has paid out in the neighborhood of $1,500,000. Thus it has been of material assistance to prospectors and small operators who have not the means to proceed with the development of their properties. The mine is in a labyrinth of underground workings between forty and fifty miles in extent, and last year some 24,600 feet of levels, crosscuts, raises and chutes were added, while nearly 27,000 feet of exploration was done by diamond drill.

Ashcroft B. C.

Diamond drilling, which was undertaken by the Provincial Government under the terms of the Mineral Survey & Development Act on the Snowstorm Group of Claims, Highland Valley, has been discontinued temporarily. The exploration is reported to have disclosed some veins of high grade copper and is to be continued after some more surface work is done on the Iona Claims, which are a part of the Snowstorm Group. W. S. Drury D.L.S., of Victoria, has been engaged to survey their properties. In the meantime itis considered likely that the Government will undertake diamond drilling on other properties, application for which has been received from the owners.

Grand Forks B. C.

A route for a proposed power line from the hydro-electric plant of the South Kootenay Power Company to the mine and mill of the Rock Candy Property, Lynch Creek, near Grand Forks, is being surveyed. The installing of additional plant at the Mine is almost complete and shipments running about 100 tons a day are expected to commence about the 1st. of October. Most of the product will go to American chemical plants.

Volney Richmond, superintendent of the Northern Commercial Company, reports that Thomas Aitken will have over 1,000 tons of high-grade ore ready for shipment from his property Nixon Fork, near Ilatarod and a like amount from Katishna near Fairbanks.

Trail B. C.

Ore shipments in gross tons for the week from Sept. 8th to 14th, 1919, inclusive, to the Trail Smelter of the Consolidated Mining & Smelting Company totalled 6,503, bringing the aggregate for the year to 247,651. The largest independent shipper was The Quilp Mine of Washington State with 383 tons while the Mandy, Le Pas, Manitoba, was a close second with 322 tons. Next in order were the Josie (Le Roi) Rossland B. C. and the Blue Bell, Riondell, with 268 and 144 tons respectively. The Sullivan Mine again was the largest contributor of the company's mines with 3040 tons while Centre Star, Rossland B. C., was next with 1855 tons.

Trail B. C.

Since taking over the property of the Dolly Varden Mining Company, Alice Arm B. C. the Taylor Engineering Company has done splendid work. The railway from tidewater to the mine, which was incomplete at the beginning of the season, has been taken to the mine and is in operation and the mine has been re-opened and put on a shipping basis. Approximately 1,000 tons of ore already has been shipped from the Dolly Varden which is reported to be giving returns of over $50 a ton. The development of other properties in the district is going forward energeticcally and it is predicted that there will be a number of paying mines in operation before many months hae passed. Although the attention of the mining world is largely held by the Salmon River Section, Portlanl Canal, at present those interested in Alice Arm hold firmly to the belief that this part of northern British Columbia is destine to command one of the first places among the mineral producting sections of the Canadian West. Operations now are agitating for government assistance to provide wharf and bunker accomodation at tidewater sufficient to take care, not only of the product of the Dolly Varden Mine, but as well of all the other producers and prospective producers of the section.

Salmon Arm B. C.

The report of another important discovery comes from Salmon Arm, Portland Canal, where is located the Premier, the Big Missouri, and other properties much in the public eye of late. The most recent excitement was caused by the presentation of a sample of ore taken from the Spider Group to the Portland Canal Prospector's Association. It was declared to be an exceptional specimen of wire silver and Pat Daly, who was instrumental in interesting B. K. Neill in the Premier Mine and who has been in charge of development at the Ppider, estimates that $10,000 worth of ore was blown down in three shots. Some months ago R. W. Martin, of the Mineral Hill Mine, took the Spider under option for $30,000 and turned it over to R. W. Wood, president of the Premier Mining Co. Mr. Daly has a small force at work on the Spider. Three veins has been found. Two of them are small, one showing two and a half feet of ore, another eighteen inches and a third measuring twenty four across. These showings are being exposed by surface stripping.

Dawson Y. T.

The Mayor Camp in the Upper Stewart River country continues to develop well and it is stated that several thousand tons of ore will be ready for shipment with the opening of navigation next year. Some fifty claims have been staked on Keno Hill, at the head of Lightning Creek, a tributary of Duncan Creek. The Guggenheims are reported to have taken an option on the main group of claims and to have sent in men and supplies in order that work may be continued during the winter. The claims are situated on a high ridge of the Rockies. 1500 feet above the timber line.

Yukon Notes.

The settlement of a several million dollar lawsuit, involving the Granville Mining Company, Canadian Klondike Mining Company, Canadian Klondike Power Company, Marion Steam Shovel Company of Marion, Ohio, and several others, has just been affected at Dawson, Y.T. Among the shareholders are Herbert Hoover, the American food controller, who is a big shareholder in the Granville Company; Chester A. Beatty, a noted New York mining engineer; Lord Braeburn of London; Lieut.-Col. Joseph W. Boyle, of Klondike. It is understood that Lieut.-Col. Boyle retires from the Canadian Klondike Company under settlement.

This large concession was originally secured by Lieut.-Col. Boyle twenty years after which he put on three huge gold dredges, costing half a million dollars each. It is understood that since the settlement a reorganization of the company is planned. The Klondike has from 150 to 200 miles of rich gold dredging grounds yet to be worked, which will require perhaps twenty or more years to work out.

From Dawson comes the report that Matson creek in the Sixty-mile country continues to contribute a share of gold to the Yukon's annual output and promises to do so for some time to come.

J. D. Dyke, John Matson, the discoverer of the creek; and Frank Wagoner, an old timer of the district, all worked on the creek this summer. Some of the time while shoveling in, they got as high as $16 per day. Many days of preparation brought this lower on an average but still left them enough so that they are planning to resume mining next summer and drift the ground the following winter. It will be remembered that several years ago Matson creek and tributaries, which empty into Sixtymile, were stampeded and hundreds of claims staked.

It is reported there is considerable activity also on the Tenmile which flows into the Sixtymile ten miles up from the Yukon. Five men were mining on Sixtymile Creek and more are to be there this winter.

Amos Benson has recently brought to Juneau some fine samples of free-milling gold and heavily mineralized quartz which he secured in the district along Shuck River. One of the samples, a white crystalized rock, carries nuggets of bright yellow gold weighing several grains.

Mr. Benson prospected on the Shuck river some years ago. Though no rich ground was uncovered enough gold was taken from the stream to warrant further investigation.

The ledge from which the samples were taken lies a considerable distance up stream and over a difficult route. Though pleased with his discovery Mr. Benson knows that all good looking prospects do not develop into paying propositions but he believes that this discovery is well worth the expenditure of time and money to demonstrate its worth and, should the ore body prospect as surface indications would show, it would warrant the expenditure of enough money to solve the question of transportation.

NORTHERN ONTARIO.

The Gold Mines.

Boston Creek District.—The clearing of the right of way for the electric power transmission line has been completed this week from the main line to the Miller Independence. The work of putting in the poles is now under way. The electrical equipment is all either on the ground, in course of transportation or ready for shipment, and it will be possible to change over from steam to electric power before the end of the year.

At the present time working forces are growing, some forty men now being on the pay-roll. Two shifts are being worked, and it is proposed to increase forces so as to work three 8-hour shifts. The central shaft has attained a depth of 235 feet and is being continued to the 400-ft. level, where it is proposed to carry on lateral operations along the main ore body.

Added accommodation is being provided for the staff, a new office building being in course of erection.

In spite of the large amount of road work being done in various parts of the mining and farming districts of the north, it is learned from an official source that the Ontario Government has decided to assist the mines in the Boston Creek district by providing satisfactory transportation.

It is learned that the great difficulty to secure men on other roads such as that from Elk Lake to Gowganda, and from Swasthika to Kirkland Lake has made it almost impossible to carry out the proposed work on the Boston Creek road. However, it is authoritatively stated that instructions are being given to have this work carried out.

The marked success which has attended mining operations in this new field long since convinced the Department that a road must be provided for the district as soon as possible, and the statement that the instructions are being issued to carry out the work conveys good news to property owners there.

A party of shareholders of the Boston-Kennedy Gold Mines have just concluded a visit to their property at Boston Creek, returning south Friday night. It is learned that the shaft has reached a depth of 50 feet, and the result of the work so far done has been highly satisfactory, a considerable quantity of commercial ore being encountered.

Included among the party of visitors were the following: T. B. Tough, Dr. H. Logan, Col. W. W. Thompson, A. C. Thorburn, all of Niagara Falls; Col. A. T. Thompson, Ottawa, and Gordon McLaren, Hamilton,, and Phil Grise, Midland.

Arrangements have been made to commence sinking operations on the property of the Catherine Gold Mines, in the township of Catherine in the Boston Creek district. Visible gold and gold tellurides have been previously discovered on surface, and the underground operations are for the purpose of determining the nature of the deposit at depth.

Lake du Parquet (Agotawekami Lake), Quebec.

According to advice from Lake Du Parquet (formerly known as Agotawekami Lake), the Timmins interests of the Hollinger Consolated have secured an option on the Bishop claims, comprising one of the most promising prospects in that district.

The fact that the Timmins interests had entered the district was known. It now develops that they have had a representative in the person of Mr. Pare secure several hundred acres, by staking, and propose to carry out a more or less comprehensive exploration campaign on these claims as well as the Bishop property on which an option is held.

Lake Du Parquet is situated in the Province of Quebec, close to the Ontario-Quebec boundary at a point near Lake Abitibi. Geological conditions are said to resemble in many respects that occurring in the Porcupine field. Quartz veins occur in which there is said to be very considerable mineralization although surface assays do not show a commercial gold content. From some of the outcrops, gold can be "panned" out and a limited amount of visible gold has been found. A small rush of prospectors occurred a year or so ago after which interest died down to low ebb. The entry of the Timmins interests has served to cause added attention to turn in that direction with the result that a number of mining men in the Cobalt district have again become interested in mining claims in that area.

The new district is one about which no sensational statements are being made, and which is contended to be nothing more than a particularly promising prospective area. The fact that the Timmins Brothers have interested themselves is pointed to in the north as reasonable assurance that at least it will receive a fair test.

In view of the promising results met with in the course of exploration work prior to the economic strain caused by the war, a number of properties in the Deloro township section of the Porcupine gold area are expected to resume operations just as soon as adequate labor appears to be available.

On a number of properties in Deloro a considerable quantity of visible gold was found in the early days, and upon which deposits very little other than surface work was done. It is for this reason that mining men anticipate a revival of interest in that area.

Larder Lake District.

The work of continuing the shaft of the Argonaut, Gold, Ltd. (formerly the La Mine D'Or Huronia), in the Larder Lake district, is well under way and will be continued to a depth of 200 feet. Heretofore, work has been confined largely to tunnelling and surface, the deepest point reached being about 70 feet. Diamond drilling has indicated commercial ore at greater depth, and it is proposed to develop these indicated ore bodies.

The company derives electrical power from the power plant of the Associated Goldfields at Larder Lake, being provided with facilities for transmitting about 400 h.p. to the Argonaut. The small test mill will probably be set in operation within the next few weeks, and a moderate rate of production established.

Kirkland Lake District.

The mines of the Kirkland Lake district have exhausted their patience and, knowing that a majority of men in the camp are in favor of returning to work, will immediately set about the work of putting the mines in shape for operation. The situation is peculiar. For instance, while about two-thirds of the men actually involved in the strike have voted in favor of returning to work, the union executive has solicited votes from other parts of the district where the strike is not in force and in that way the result of the voting was changed to a majority in favor of continuing the strike. The situation is so absurd as to lead the mining companies to abide by the will of the men directly involved, and disregard the union executive. As a result of this, those men who have been on strike through

no fault of their own will receive employment which they are urgently in need of.

Toward this end the Lake Shore has already engaged in a number of men and made a start early this week. The Kirkland Lake Gold Mines is expected to follow suit, with similar action at the Wright-Hargreaves. For the time being the general shortage of labor is expected to militate against securing full forces, but today marks the beginning of the end of the strike. The official statement from Ottawa that unemployment during the coming winter will reach at least 80,000 or perhaps amount to as much as 140,000 is interpreted in the north as constituting abundant assurance that the present labor shortage will soon disappear in which event the gold producing mines will be permitted to operate at full blast and during 1920 almost double the record established during last year.

The Hunton-Kirkland Company has let an option on 400,000 treasury shares, and the indications are that an aggressive exploration program will be carried out on the property. Although detailed information is lacking, it is understood the option price is 20 cents a share and will net the treasury something like $80,000.

The Hunton was one of the first properties in the Kirkland Lake district to attract attention due to spectacular gold showings being opened up on surface. It was involved in a deal with English interest at the time war broke out, and it is chiefly for this reason that the active development has been deferred.

The property is situated on the auriferous zone on which is located such properties as the Ontario-Kirkland and the Canadian-Kirkland, and adjoins the producing belt on the immediate south.

Fort Matachewan District.

According to information from the Fort Matachewan district the Nelson group of claims are standing up well under active exploration. Surface work has resulted in showing the veins to be strong and well-defined, and, in one place where a pit was put down a few feet some rich ore has been encountered.

The Nelson claims are situated in the township of Baden, near the Indian Reservation, and just a few miles north from the scene of the first discoveries made in the district.

Porcupine.

An analysis of the physical and financial position of the McIntyre-Porcupine Mine, Ltd., is of particular interest and importance at this time, due to official figures being available for the past fiscal year. Intrinsically, the shares in the company appear to be worth about $1.02 each, based on the following facts:

Ore reserve	433,057 tons.
Value	$11 per ton.
Cost of treating	5 " "
Net profit	6 " "
Total indicated profit	$2,598,342.00
Surplus as of June 30th	1,163,731.83
Combined value profit and surplus	3,762,073.83
Issued shares	3,640,283.00

The earning power of the McIntyre during recent years has been such as to warrant quotations in excess years has been such as to warrant quotations in excess of the intrinsic value. For instance, during the fiscal year ended June 30th, last, a net profit of $527,112.28 was realized after having allowed for depreciation of plant. This is equal to about 14½ per cent on the issued capital of 3,640,283 shares, of the par value of $1 each. However, even this would not appear to warrant current market quotations, the net profits being equal only to 7 per cent on shares purchased at $2 each. Conservative mining men usually consider a 10 per cent return as being a reasonable minimum interest on money placed in shares of precious metal mines, in which case the earning power of the McIntyre as demonstrated in the past year would make the stock worth about $1.40 a share, or some 38 cents a share above the intrinsic value, but 60 cents a share less than present quotations.

Added to the foregoing facts, is another factor. This is the potentialities of the mine. That is to say, although over four and three-quarter million dollars is in present known ore reserves, there is nothing that would indicate that the limit of the ore deposition has been reached. Thus, in paying $2 a share for the stock, the purchaser is betting at the rate of 98 a share above the intrinsic value, or some $3,567,477.34 on the potential value of the mine in addition to the present known value of $3,762,073.83, or a total of $7,329,551.17. In order to realize a net profit of the latter amount, based on costs of $5 a ton and profit of $6 a ton, it would be necessary to mine approximately $13,437,410.47. This compares with just $4,777,324.00 now in sight. Of course, the present surplus is a big consideration and assuming the $1,163,731 surplus has been accumulated on a basis of costs similar to the above calculations, it would be proper to deduct $2,133,508.33 from the $13,457,410.47, thus leaving it necessary to ultimately mine ore containing $11,303,902.14 in order to make the shares of the company worth $2 each. General opinion appears to be that this will indeed be achieved, but the situation is one that shows to what extent the shareholders at large are given to discounting future developments.

Not a few shareholders of the Porcupine Crown have become impatient over the delay in resuming production. Crown operations have been going on during the past severtl months.

The mine has been de-watered, and the mill endeavor, or a constant endeavor to secure sufficient men has met with more or less discouraging results for which reason the operation of the mill has been temporarily delayed. While such large mines as the

The Porcupine Crown Mine

Hollinger and the Dome find it possible to operate at half capacity, it is invariably found to be more difficult to work a small mine at half capacity, hence the delay. In due course, probably this fall it should be possible to resume production. The management is reliable and efficient.

Ore reserves at the beginning of the year were estimated at about $500,000. The financial statement showed a surplus of about $250,000. During the past few months this surplus will probably have been reduced somewhat, but is evidently still above $200,000. It can be seen, therefore, that the physical condition of the mine is comparatively satisfactory as also is the financial position of the company. These factors combine to make Porcupine Crown appear quite sound.

More plentiful labor supply likely to improve gold outputs.

The gold mining industry of Northern Ontario has weathered the storms of adversity of the past three years and is now confronted with conditions which turn the tables. Forty thousand men without employment in Canada, and the number likely to reach eighty thousand this winter or a possible maximum of one hundred and forty thousand before the winter is over. Such is the official statement coming from the Department of Labor at Ottawa.

Unemployment is a condition which is to be regretted. In a great new land like Canada, it is strange that it should exist. Nevertheless, the country is confronted with the cold facts and must prepare to meet them.

In the north, particularly at Porcupine and at Kirkland Lake, the statement is on that seems to bring assurance that the shortage of labor out here at the outposts of Canadian industry and of civilization itself is soon to become dissipated. It seems to convey assurance that within the next few months every gold mine which is equipped with milling machinery will be permitted to operate at full capacity. It even indicates more than that, in this added respect, that it indicates a likelihood of workmen finding it necessary to compete for jobs, with an inevitable increase in the efficiency of the work being done.

It appears to be the consensus of opinion at this time that all that stands in the way of the Hollinger establishing a world record is an adequate supply of labor. It seems to assure the Dome Mines of prosperity commensurate to its position of being the second largest gold mine in Canada; it opens possibilities for the McIntyre-Porcupine being able to increase its output considerably, and it seems to assure the other proven mines of a profitable producing era—such mines as the Lake Shore, the Porcupine Crown, the Kirkland Lake, Teck-Hughes, Tough Oakes, Schumacher, Porcupine V.N.T., Dome Lake, as well as such new mines with mill construction progress under way as the Wright-Hargreaves and the Miller Independence and the Davidson. More than that, it clears the way for the mines now in the development stage, such as the Orr Gold Mines, the Clifton-Porcupine, La Belle Kirkland, the Ontario-Kirkland, Canadian-Kirkland, Elliot-Kirkland, Porcupine-Keora, Baldwin, Matachewan Gold Mines, Argonaut Gold and Bourke's Gold Mines, as well as a number of other promising mining properties situated in Porcupine, Kirkland Lake, Boston Creek, Skead township, Larder Lake, Fort Matachewan and West Shining Tree, from among which number it appears to be reasonable to hope for a number of profitable mining propositions.

The Silver Mines.

At the great majority of mines in Cobalt, operations have once more attained full capacity. No serious shortage of labor has materialized, the price of silver has advanced to new high levels and the general outlook is entirely favorable. The labor strike, now past, has served to clarify the situation in that respect and general prosperity is once more being experienced.

The substantial increases in the price of silver has added a considerable tonnage of ore to reserve at the mines. For illustration, ore containing low silver values, too low to treat at a profit on silver at around $1 an ounce is found to constitute a substantial source of revenue with silver quoted at the present high price. It means that ore which in the old days of 50 cent silver contained 20 ounces to the ton had a value of but $10 a ton whereas ore now containing only 10 ounces to the ton has a value of $11.80 with silver at $1.18 an ounce, at the time of writing.

The McKinley-Darragh has attained a normal rate of output, it is learned, and the last quarter of the current year promises to more than care for the usual dividend rate. The milling equipment is operating at full capacity on ore coming from the main workings as well as from a surface dump and some from the Savage property.

The number of men engaged in somewhat less than in July, not for the reason that tonnage has been reduced, but due to carrying out plans which had been arranged to begin in August.

During the week ended Oct. 3rd, five Cobalt companies shipped a total of ten cars containing approximately 818,223 pounds or ore. This is the heaviest week since the end of the strike almost a month ago.

The Nipissing with four cars was the heaviest individual shipper, as shown in the following summary:

Shipper	Cars.	Pounds.
Nipissing	4	368,751
Buffalo	3	256,170
Trethewey	1	65,177
Hudson Bay	1	64,125
O'Brien	1	64,000
Totals	10	818,223

During the corresponding period the Mining Corporation made a large bullion shipment amounting to 96 bars and containing 95,873.83 fine ounces.

NEW ZEALAND COAL MINERS ALSO DIFFICULT TO SATISFY.

Just at present there is an acute shortage of coal in New Zealand. If the climate of the Dominion made the warming of houses a necessity, the position of the general public would be lamentable. Industry is hampered and we are threatened with restriction of railway and train service. American coal has been brought here via the Panama Canal and landed at a cost of £3 10s per ton. The country would take more even at that price if it were obtainable. Yet New Zealand's coal fields are large and many easily accessible seams are not being worked. Labor is not wholly responsible for this state of affairs, but it is no secret that the local coal miners are "going slow." They have short hours and high pay. With a 44-hour week, a New Zealand coal miner can earn more than a skilled artisan. But the miners are discontented, rightly or wrongly, and their discontent appears to be beyond the power of the industrial laws to remedy.

THE PREMIER GOLD MINE, PORTLAND CANAL, B.C.

Chas. Bunting, one of the original locators in the now famous Salmon River District, Portland Canal, B.C., has written an interesting account of the history of the Premier Mine, of the richness of which much has been heard of late. He also tells something, in general terms, of other mines and prospects of that highly mineralized section.

It is best, however, that Mr. Bunting should speak for himself.

"Much has been written about the Premier Mine, situated near the head of the Portland Canal, which, while interesting, is at variance with the facts. The writer is well acquainted with the property, its ore bodies, values and history and will briefly review the facts relating to the above and indicate the immense possibilities of this remarkable mine. All the known ore bodies of the Premier, three distinct veins generally referred to as the low-grade veins, as well as the high grade vein, are found on two of the company's claims. These are the Cascade Falls No. 4, and the Cascade Falls No. 8, which were two of a group of eight claims numbered 1 to 8 and known as the Cascade Falls group. They are situated on the western slope of the range which divides the Salmon River from the Bear River and were the first locations in that section of the Salmon Valley. They were discovered and staked by Wm. Dilworth and the Bunting Bros. in June, 1910. The two claims numbered 4 and 8, along with an adjoining group staked later by other parties passed to the control of O. B. Bush, the Salmon Bear River Mining Co., being organized by him during the winter of 1910-11 to operate them.

"The work carried on the two following summers by the Salmon-Bear River Mining Co. which consisted of short tunnels and surface cuts, was confined to the low grade showings, the results being fairly good. A great ,outcropping much good looking quartz, some iron pyrites and a little native silver was "passed up" after a few shots had been put into it, and no attempt was made to trace it out. This outcrop has since proved to be the biggest and best surface showing of the high grade vein.

"The property was then idle until the summer of 1914, when it was examined for a well known eastern Canadian company by W. J. Rolf. The outcropping referred to attracted his attention and interest and work commenced at once. The vein was traced for fully 800 feet, down the hill in a westerly direction, the surface was stripped and cuts put in at intervals along its whole length. The results were excellent, good ore being exposed in every cut, some of it running as high as $500 in gold and silver.

"After securing such fine returns, for some unknown reason —possibly on account of the outbreak of the war— this company discontinued work. A good deal of credit is due W. J. Rolf for his shrewdness in confining his work to this particular vein to the exclusion of the low grade showings, thereby demonstrating the presence of at least one large ore body running exceptionally high in gold and silver, with a lead content of less than one tenth of one per cent. Until this time speculation regarding the future of the camp, had been based on the great showing of low grade ore.

"An entirely new conception of the potentialities of the camp was a direct outcome of his activity. The property was then immediately bonded for New York interests by H. R. Plate, and work commenced the ensuing winter. A tunnel, No. 1, was started at an elevation of 2,100 feet on the high grade vein in good ore, and another tunnel, No. 2, at an elevation of 1,850 feet on the middle low grade vein, also in good ore. No. 2 cut the ore shoot diagonally for over 30 feet, the values being good. The tunnel was extended about 200 feet beyond the ore shoot into the country rock, and a crosscut of 30 feet to the left from the face was also in country rock. Work was then stopped in this tunnel. No. 1 tunnel was also driven diagonally across the ore shoot, which gradually left the tunnel on the right hand side at a point about 80 feet in. The tunnel was continued almost straight ahead—following a slip for a considerable distance—for a farther 170 feet a total of 250 feet, without picking up the ore again. A crosscut was also driven to the right for about 12 feet, about half of it being in vein filling, but lean. This tunnel was then abandoned. A crosscut was then driven northerly from a gulch some 200 feet south of tunnel. After being driven 60 feet without getting ore, this too, was abandoned.

" A crosscut tunnel, No. 4, was now started farther down the hill, about 450 feet below No. 2 and driven about 500 feet before the vein was encountered. This proved to have a width of well over 100 feet, but was poorly mineralized. A drift of 40 feet alongside a small diorite dyke was run in which some ore was just showing up when the New York syndicate threw up their bond and quit the camp, after operations extending over nearly 18 months at a cost exceeding $60,000.

"In the summer of 1918, a few months after H. R. Plate had left, R. K. Neill of Spokane was induced by Pat Daly—who had been foreman for both Bush and Plate and still believed it would make a mine—to look over the property. The examination and sampling proving satisfactory, Mr. Neill bonded it the following winter for $100,000, beginning work in the Spring. His first work was done in No. 1 tunnel at the point where the high grade left it to find out what happened to the ore, with the intention of following it if it continued. A few shifts sufficed to show the vein was really paralleling the tunnel, and at no point in the whole 250 feet of Plate's work was it more than 6 feet away, while the face of the tunnel where work was stopped was actually in the vein.

"As the vein here is almost barren—values $1.50—and closely resembles the wall rock in which he had drifted for the last 160 feet, no doubt Mr. Plate failed to realize that he was in the vein. Had he, before deserting this tunnel, driven 2 feet to the right he would have been in $5 ore, while 5 feet ahead would have reached high grade ore.

"This is an outstanding example of a great mine being missed by a very small margin. It is just such hazards and great rewards that gives mining the fascination no other industry possesses.

"When the first work showed beyond a doubt the real direction of the ore body, nothing more was done there. A crosscut was started about 60 feet farther in, and reached the ore in 6 feet. Plate's 12-foot crosscut was extended about 30 feet. After driving each of these crosscuts into good ore for nearly 40 feet, without reaching the other wall, Neill decided to start a crosscut from the face where Plate had quit, and also to drive ahead a further 600 feet to get under the last of the series of open cuts which exposes the ore shoot on the surface and shows it to have a width of from 100 to 150 feet. This crosscut, No. 3, showed good milling ore the first round; at 15 feet high grade came in and stayed the full length of cut. It was driven 82 feet without reaching the hanging-wall, a cut on the surface directly above shows fully 40 feet of good ore yet to be cut. For some distance the full width gave values of several hundred dollars a ton in gold and silver, while the average for the entire 82 feet is better than $55.

"The face of the main tunnel was swung a little to the right and driven ahead. In 4 feet, ore running over $125 a ton showed up on the right hand side; at 10 feet there was a full face of ore, showing considerable natives and ruby silver which gave values of $153 a ton. This tunnel has since been driven about 350 ft. farther and with the exception of about 30 feet, when passing through some almost barren ground the full width of tunnel has been in high grade ore, averaging several hundred dollars a ton.

"No. 4 crosscut which is in about 40 feet cut 10 feet of high grade, then passed into ore of a lower grade. No. 5 crosscut recently started, averages $50 a ton for the 6 feet it is in. This tunnel is now in a distance of approximately 600 feet, giving a vertical depth of nearly 300 feet. It has still to be driven about 200 feet to get under the great surface exposure already described. This will give an additional depth of perhaps 50 feet only as the hill flattens considerably above.

"In the block of ground 800 feet long and fully 100 feet wide as proved by surface cut and underground work and from the surface to the present level, a tonnage of at least 1,000,000 can be safely estimated with a gold and silver content of $30 a ton making a total of $30,000,000. A thorough sampling of all the present workings and openings gives an average value of well over $30 a ton.

"As the ore shoot is bigger, stronger and far richer in the tunnel than on the surface it is safe to assume it will continue for at least 50 feet below the present workings.

"In that event—and any engineer familiar with this ore body would concede that much—a further $10,000,000 can be added to the above total. Work was resumed in No. 2 tunnel this summer, a crosscut being driven to the right, to cut the ore shoot about 150 feet east of the portal where originally cut by Plate. In about 60 feet the ore was broken into. It has a width of 10 feet. The average across is a little less than $20 a ton.

"This crosscut was continued and has since tapped the ore shoot to the south. The face is at present in good ore.

"Each of these veins, and also another to the north of them has the appearance of potential mines. During the whole summer of 1918 the mine was shut down, work being concentrated on the construction of a sleighroad from the beach to the mine, a distance of 16 miles, and a short dock at Hyder for the purpose of shipping ore the next winter. Owing to unforseen delays in the delivery of equipment and an exceptionally early break-up of the snow-road in the spring, only 512 tons was shipped, which gave smelter returns of $168,000.

"Two stopes have been opened up, putting the mine in good shape for shipping as soon as the snow flies. Since the snow went, operations have been almost entirely confined to outside work. A portable sawmill is cutting lumber and a number of new buildings are being erected at the old camp for the accommodation of a greatly increased force of miners. The road is being widened and improved, and new barns and other buildings will be put up at the beach and nine mile. The sawmill has been moved to No. 4 tunnel—H. R. Plates last work—and a new camp is being built there. A compressor is to be installed and the present 5x7 tunnel enlarged to 7x7.

"A crosscut will be started a short distance from the face which will reach the high grade ore shoot in a few hundred feet, at an additional depth of 700 feet below the present workings.

"Providing the ore shoot holds its size and values at that depth—and the chances are decidedly in its favor—the figures relating to the tonnage and values will be almost startling. In that event, this property, which already ranks as one of the world's great mines, would then take rank as one of the greatest.

"It will still be possible to obtain a further depth of fully 500 feet on the vein by driving another tunnel near the foot of the mountain, making a total of not less than 1,500 feet below the highest outcrop. With the downward extension of the ore body to this point it would be conceded the unique distinction of being the world's Premier Mine.

"It remained for R. K. Neill to realize the possibilities dimly disclosed by W. J. Rolf after others had failed, and his great success is in a large measure due to his good mining judgment, and his policy of staying with the ore whenever possible. Such phenominal results after little more than two years' operations have been rarely, if ever, achieved before, even in mining, certainly in no other business.

"The vein in which this ore body occurs is a true fissure. Its strike is No. 80° E., its dip slight and southerly. The vein filling is largely quartz porphyry, often changed completely to quartz. The metallic minerals which can be seen are: argentite, stephenite, native, and ruby silver, and iron pyrites carrying high gold values and there is reason to believe some of the tellurides are present at times.

"Some wonderful specimens of native and brittle silver and some silver glance and ruby are obtained from a small persistent stringer in the big ore-shoot which varies from 1 to 10 inches in width. The values of the whole ore body are fairly well divided between gold and silver, although the latter predominates. The dump at No. 1 has a value well over $200,000, practically every ton having been taken out in straight development. The mine is situated on a rather steep hillside ensuring the most economical mining. There is an abundance of timber for all purposes; also ample water for power, milling, etc., are right at hand. Associated with R. K. Neill of Spokane in this unusually successful venture were R. W. Wood and A. B. Trites of Fernie, B.C., and they are now, with W. R. Wilson of Fernie, the fortunate owners of this ideal mine.

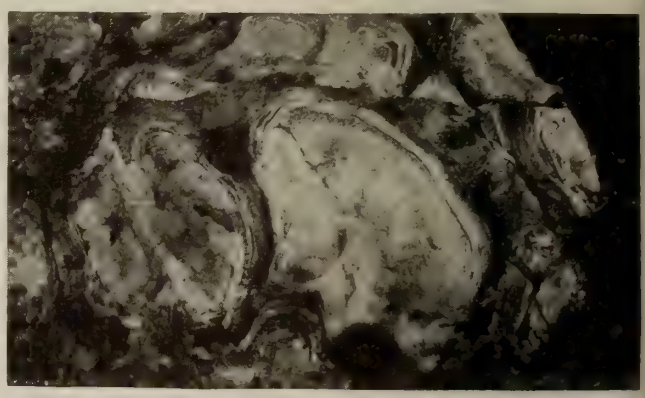
"The successful development of the Premier naturally caused renewed activity and interest, which resulted in the discovery of several new ore bodies of the same character in different parts of the mineral belt. These showings have all the 'ear marks' of mines to a superlative degree so far as the surface is concerned. In some cases the surface exposures are bigger than those of the Premier with the values fully as good."

PILLOW LAVAS.

In the reports of the geologists of the Ontario Bureau of Mines numerous references will be found to 'pillow' lavas. The term is applied to such rocks as are shown in the accompanying photograph of outcrops on the property of the Hollinger Consolidated Mines.

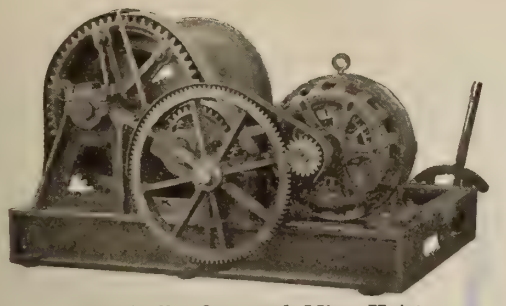
The structural feature illustrated by these photographs is of considerable use in determining the nature of some rock outcrops. There are numerous varieties of fine grained rocks that are not easily identified in the field. The pillow structure is characteristic of certain volcanic rocks and is not found in sedimentaries. It can be used by the prospector as well as the geologist for identification of formations in Ontario gold areas.

Pillow Lava, Hollinger Mine.

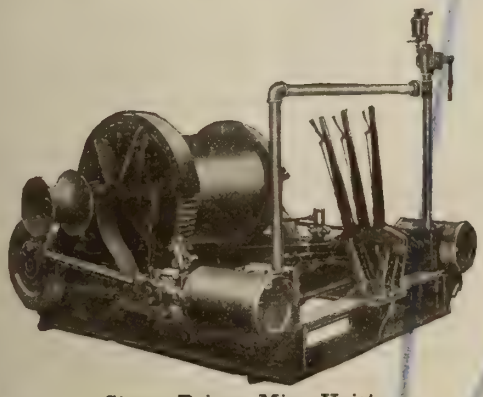


Pillow Lava, Hollinger Mine, a closer view.

Pillow Lava "knobs", Hollinger Mine.



Electrically Operated Mine Hoist.



Steam Driven Mine Hoist.

7 OF OUR MINE HOISTS IN USE BY ONE N.B. MINER 7

and this is not the only firm in Canada using seven of our Hoists.

Would these customers continue to purchase our Hoists from year to year as their business grows without a good reason?

Quality and service count for much more than price in the long run, and while we can assure you that the price of our Hoists is reasonable, the price alone would not have secured us these many repeat orders. These customers were satisfied with the quality of the Hoists, the honest workmanship and material put into the machines, the skill exercised in their design, and their comparative freedom from premature breakdowns or repairs.

Our Mine Hoists are built right, and give the best of service—that is why our customers stay with us, and continue to order more machines as their needs increase.

Choice of 7 sizes in either Electric or Steam Hoists, ranging from 10 H. P. to 50 H. P.

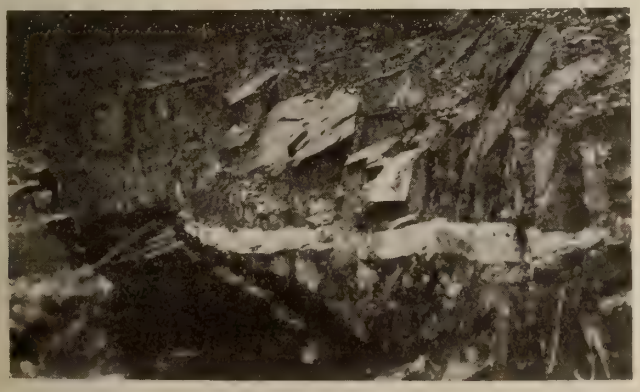
MARSH ENGINEERING WORKS, LIMITED, Established 1846 **BELLEVILLE, ONTARIO**

Sales Agents: MUSSENS, LIMITED, Montreal, Toronto, Winnipeg and Vancouver

MILLER-INDEPENDENCE GOLD DEPOSITS.

The accompanying photographs show two of the gold deposits on the Miller-Independence property, Boston Creek. Work was at first confined to the nearly flat vein shown in the first photograph. It is a regular well defined white quartz vein enclosed in dark colored basaltic rock. The rich deposit is not well exposed, but the second photograph shows an outcrop at the edge of the rock dump at the shaft. The ore on the dump shows the quartz to be enclosed in a fine grained dark colored rock that has been altered to a light gray colored pyritic rock close to the vein matter.

Outcrop of Quartz Vein Carrying High Values at Miller-Independence Mine. Photograph was taken looking vertically downwards on the ground.



An Auriferous Quartz Vein in Basaltic Rocks. Miller-Independence Mine. Opening is Flooded.

SEVEN HOUR DAY IN SPANISH MINES.

Spanish miners in Asturias have won their fight for the institution of a seven-hour day.

The deputation of miners from the province of Oviedo, which came to Madrid to wait upon Premier Toco and present their demands, was informed by the Premiet that the mine owners had granted the seven-hour day for work in the galleries, and an eight-hour day outside. This applies to Oviedo mines.

The strike movement in Spain in general shows a great decrease, according to a summary of the reports from various parts of Spain, and tranquility prevails throughout the country.

OUR ADVERSE TRADE BALANCE.

Balance of $1,045,000,000 in States' Favor in Three Years.

Winnipeg—Through western Canada fall business was never so promising, or collections and cash discounts so favorable. This is true in all lines, though prices are still advancing. Industrial unrest is appreciably less. Probably the most extraordinary feature of an international character concerns shipment of every variety of lumber to the United States. This heavy draft on the domestic supply has continued all summer, and result has been a marked decrease in building on the prairies since the average consumer refuses to pay the price the American market seems to regard as reasonable for Canadian lumber. This demand of the export trade is attributed to the "build your own home" campaign in the States. Business has increased with the fall orders and one result has been a very much larger cut of logs in Canada than usual, as it is believed demand will continue through next year.

This is the favorable condition under which the Victory Loan will be projected next month by the Federal government. Unfavorable discount in the States is a factor that is seriously agitating the western provinces and curtailing import of American factory products. It is felt American manufacturers should mark the following facts:

In three years ended last June, Canada imported manufactured merchandise from the United States, valued at $2,228,000,000. Her exports on the contrary to the United States, chiefly raw materials, were valued at but $1,183,000,000. Thus unfavorable trade balance was $1,045,000,000 for that period. The United States for these three years supplied 81 per cent of Canada's imports from all sources. Customs returns since June indicate that there is no diminution in these purchases. On the other hand, of Canada's total exports to all countries amounting to $4,029,000,000, only 29 per cent, or $1,183,000,000 went to the States. Fifty-one per cent, or $2,076,000,000 went to the United Kingdom and 20 per cent to all other countries.

Canada's imports for that period from the United Kingdom equalled only $251,000,000, balance in Canada's favor being $1,189,000,000, against unfavorable balance in favor of the United States of $1,045,000,000. Critical state of the foreign trade is the subject of much concern among business men of the Dominion. Canada finds herself already a considerable creditor of Britain and likely to become a heavier one and at the same time ranks as one of the chief debtors of the United States.—Boston News Bureau.

THE LATE JOHN MITCHELL.

A despatch from White Plains, N.Y., which contains the information that John Mitchell, former president of the United Mine Workers of America, left an estate of $250,000 is interesting for many reasons. It seems to constitute still further evidence of the fallacy of socialism.

Mr. Mitchell was a leader of labor. In his short career he accumulated a substantial fortune. There are socialists who declare that no man can honestly earn such an amount. Such a contention finds refutation in every walk of life. The ambitious man is found leading the way, just as Mr. Mitchell was a leader of men. In accumulating $250,000 he performed incalculaby valuable service for labor. In doing so he became a so-called capitalist. There seems to be no doubt but that he worked sincerely for the benefit of the laborers whom he served, for which service he received only a just reward.

When the captains of industry succeed, it is usually through hard work, sometimes almost nerve-racking strain. They exert to the limit all their mental energy and sacrifice pleasure to the extent of working not only during the day but long into the night. By their ability to organize, improve efficiency and avoid waste they not only make it possible for industry to pay greater profits, but make it possible to pay higher wages to the manual worker.

Leaders of men like Mr. Mitchell, captains of industry like Henry Ford and all others who succeed, are a necessity just so long as civilization continues to advance.

There will probably always be competition between the captains of industry and the leaders of labor. It means the life of a nation for such to continue. Without competition, which swings, now to the slight advantage of labor, now to the slight advantage of captains of industry, it would not be possible to find out those best fitted to establish the highest degree of efficiency, lacking which, all humanity would have to pay the price.

Business ability and sane thinking are necessary before any man can truly become a labor leader, or a captain of industry. This is a point that all men should keep in mind. All would then be prepared to have nothing to do with the radicals in all walks of life.—Cobalt "Nugget."

A locomotive burning pulverised coal as an experiment has been in use daily in Pennsylvania for more than a year without losing any time for repairs.

ACADIA COAL COMPANY, STELLARTON, N.S.

Output for September, 1919: Albion, 13,944 tons; McGregor, 6,195 tons; Allan, 4,895 tons; Acadia No. 1 (partly idle), 452 tons; Acadia No. 3, 6,746 tons. Grand total, 32,232 tons.

New Discovery of Coal in New Brunswick.

It is credibly reported that a seam of coal, varying in thickness from sixteen inches to twenty-six inches has been uncovered on the New Maryland Road, leading out from the City of Fredericton towards Fredericton Junction, distant about five miles from Fredericton. The coal is similar in quality to that found near Minto, N. B., as is also the thickness of the seam, its flat character and small overburden. The extent of the field has not been yet proved, but if it should prove that this thin blanket of coal extends from where it has been uncovered near Fredericton to the occurrence of coal with similar characteristics at Minto and the vicinity of Grand Lake, it will be a very important matter for New Brunswick. The seam is thin, but where it occurs near Minto it is of good quality, and the value of coal is always relative to its availability. New Brunswick is now producing about 125,000 tons annually, all from the one thin blanket seam, which is distinguished by its general flatness and light cover.

:-: EDITORIAL :-:

PROGRESS OF THE CANADIAN MINING INSTITUTE.

The complete manner in which the activities of the Canadian Mining Institute now cover Canada from coast to coast is shown by the last number of the "Bulletin," which contains a list of the Provincial and Local Branches and the Technical Sections now organized.

The Canadian Mining Institute can now claim to be a body that adequately represents all the direct and associated activities of mining in Canada, both in the metropolitan centres and in the mineral-producing districts.

Many years of hard work, much experimentation, much vision and tactful organization, some tribulation, but a far greater sum of good fellowship and a desire to help the other fellow, have combined to bring about the rounding-out of our Canadian Mining Institute, and to secure for it the recognition which it is now accorded as the fully accredited and truly representative concensus of the varied interests that compose the national industry of mining and its outgrowths.

The meeting of the Sudbury Branch reported in this issue, the meeting of the Montreal Branch, the forthcoming meeting in British Columbia, are indications of the wide geographical scope of the Institute, and also of the pervading desire of its members to be up and doing. The goal of the Sudbury Branch to be "the livest Branch in Canada" is finding simultaneous expression in fifteen other branches.

Membership in the Canadian Mining Institute was always a thing to be prized, but to-day it is more than ever a distinction, and C.M.I. members should wear the beaver and crossed hammers as members of the Engineering Institute of Canada, and of the A.I.M. & M.E. wear their society insignia. The members of the C.M.I. belong to no mean society, and they should feel that way about it. Such a feeling is neither "swank" nor egotism, it is but the adequate and sober realisation of a very significant fact. Canada is a continental area only partially prospected. It stands, in potentiality of population and industrial importance, where the United States stood after the Civil War. If the forefathers of the C.M.I. dreamed dreams and saw visions, they set us a good example, because in Canada there lies the substantial stuff from which vision can be translated into actuality, as time and time again it has so been translated in the lifetime of this generation of Canadians.

In the Canadian Mining Institute, now emerged from its adolesence, we have an institution that can guide the mining industry aright, can guard professional ethics while it inspires material progress in the science and art of mining; an institution which has for members the pioneers of mineral dvelopment in the Dominion, and the latest graduates of our mines and universities.

No technical society can look forward to its future with such justified optimism as should guide the policies of the Canadian Mining Institute and inspire the enthusiasm of its membership.

DAMNING WITH FAINT PRAISE.

"There are adventurous spirits who will doubtless rush to The Pas, at the head of Lake Winnipeg, in search of the gold and petroleum reported to have been discovered in amazingly rich quantities in that district. The quest of the golden fleece never wanes, but it will be well to await authentic news on the subject, and it is somewhat suspicious that the alleged find has been made by a travelling Chicago salesman. There may be gold and there may be oil in the neighborhood of The Pas. Both are found in many parts of Canada. New Brunswick produces gold, Quebec also, as well as petroleum, and in Ontario both are found in liberal quantity; to say nothing of silver. Manitoba has more than once before had its rush of gold prospectors. The precious metal is found in the North Saskatchewan river, Alberta has profitable oil fields, and British Columbia is rich in minerals. But not many an El Dorado has yet been uncovered in Canada, though the hope of doing so is constantly nurtured, and the game of chance is irresistible with many people. Surface indications of gold and oil abound and there they stop. Time and money and industry must support faith before the recompense comes, if it ever does come, and while the story of the Pas strikes is interesting, we must wait awhile to learn whether a hoax has been perpetrated, and whether, if otherwise, the indications run below the surface."

The foregoing editorial, under the title of "Time for Incredulity" appeared in a metropolitan newspaper which usually admits to its columns only accurate information, and in its editorial utterances is distinguished by correct historical perspective and wholesome good sense. For once, however, Homer nods, and it would be difficult to find more misinformation, and a more incorrect perspective of the history of mineral development in Canada than is contained in the foregoing quotation.

The Pas is not the scene of the latest mineral discoveries. The district is from 70 to 90 miles north of Le Pas, neither is Le Pas at the head of Lake Winnipeg. We have not heard of the unusual juxtaposition of petroleum and gold assumed to exist in the neighbourhood of Le Pas, neither do we recollect hearing of discoveries of gold in New Brunswick or petroleum in Quebec.

But what is principally to be objected to is the statement that "not many an El Dorado has yet been uncovered in Canada." This is damning Canada with faint praise, and is incorrect. The mineral history of Canada goes back a bare fifty years. The country is not half prospected, and many of the great discoveries have been accidental and fortuitous, and usually associated with railway extensions. Cobalt, Porcupine, the Yukon were none of them mean examples of great concentrations of mineral wealth, nor is there any reason to suppose that these camps will exhaust the "El Dorados"—if one may use the term—of Canada. The Portland Canal, District of British Columbia, the region north of Le Pas (described in the "Journal" of October 1st by Dr. Wallace, the Commissioner of Northern Manitoba) are mineral areas of great promise. In the present issue will be found a description of the Upper Harricana River gold area in Quebec that is of much interest. The possibilities of Northern Ontario are by no means exhausted, as, discounting the vicious promotion literature that is being circulated, there are a number of recent discoveries within an area that has been fairly well mapped and prospected.

What is the meaning of such a statement as "surface indications of gold and oil abound, and there they stop"? Surface indications of gold would satisfy most prospectors, neither are surface indications of petroleum to be despised. If surface indications of gold and petroleum were found combined then the prospector would be justified in becoming excited.

The writer of the editorial referred to writes truly, however, when he says that the hope of uncovering rich mineral deposits in Canada is constantly nurtured. We believe it will continue to be so nurtured. The material results already achieved in Canada justify such nourishment of hope, the geological information available indicates the scientific basis for it, and more than all, the blood of the prospector is the Canadian's rightful heritage. It is not alone the lure of gold that draws men to the search, but as expressed by Chase Osborn, in a book reviewed in this issue, "the greatest charm of prospecting is not the hope of finding wealth, it is life in the clean unhurt out-of-doors."

Incredulity in the reception of much of the mine promotion literature that is being circulated is very timely, but incredulity in regard to the mineral wealth of Canada is not justified by history or by present knowledge.

THE RIGHT TO REMOVE TIMBER FROM MINING CLAIMS IN ONTARIO.

Hartley Dewart has directed an attack against the administration of the Crown Lands Department of Ontario, which has been given wide publicity, which does not measure up to the importance which its wording would imply and which does not find corroboration in this part of Northern Ontario.

Mr. Dewart said:

"Let Hon. Mr. Ferguson throw open the books of his department to me for seven days and I will show the proportions of the dishonest scaling and inspection. Do you understand the conditions under which mining licenses are granted? Go through the North country, and you will find hundreds of claims from which timber has been cut and exported to the United States as pulpwood."

As one who has spent more than a dozen years in prospecting for mineral in the North country, the writer is aware of the unfairness of the foregoing assertions. First of all, it should be pointed out that the above does not charge the Department of Lands, Forests and Mines with dishonesty. It merely implies such by saying "I will show the proportions of the dishonest scaling and inspection." It does not say what proportion, if any, can be shown. The other statement that pulpwood has been whipped from hundreds of claims is probably correct, and mining men as well as prospectors resent the fact of this being incorporated in what purports to be a charge.

The mining laws of Ontario require the holder of a mining claim to perform 240 day's assessment work before a patent can be secured and the timber remover therefrom. Even then certain kinds of timber cannot be removed excepting for building purposes on the property. It costs the holder of a mining claim about $5 a day for performing the assessment duties, or some $1,200 for each 40-acre claim, in addition to which is a patent fee of $3 per acre, making a total of $1,320. In this way it would cost something like $5,280 to acquire 160 acres. When the patent to such land is secured at such large cost, prospectors and mining men in discussing the matter with the writer declare that they fail to see why they should not be entitled to remove timber. Furthermore, the profit which any claim holder can make from timber upon mining claims could not cover the cost of carrying the claims to patent, which fact makes it quite absurd to declare that claims are taken up for that purpose. Prospectors point out that settlers may take up 160 acres merely by paying a fee of $20 and are permitted to remove pulp timber, and fail to see why they should be drawn into a political controversy and thus indirectly made to share the onus of such ridiculous inference which residents in the southern parts of the province may be made to believe true.

J. McRae.

Mr. M. J. Warren, President of the Consolidated Mining & Smelting Company, says Canada can supply ten percent of the world's demand for zinc, and is only producing 25,000 tons. Mr. Warren intimates the Consolidated Company will make arrangements to supply the world demand more commensurate with the ore resources of his Company than the existing reduction facilities.

The Upper Harricana River Gold Area

By ADHEMAR MAILHIOT.
(Professor of Geology at l'Ecole Polytechnique, Montreal.)

In accordance with instructions received from Mr. Theo. C. Denis, Superintendent of Mines of Quebec, the writer spent a part of last summer in making a geological examination in the district adjoining lake DeMontigny (Kienawisik) where recent gold discoveries had been made.

The area is located in Dubuisson and Varsan townships, county of Temiskaming, Province of Quebec. The nearest railway station is Amos on the National Transcontinental Railway, 433 miles west of the city of Quebec and 141 miles east of Cochrane, Ontario. From Amos the route to the district follows the Harricana River on which unobstructed navigation is possible for gasoline launches and small river steamers from the railway crossing to the mining camp and 30 miles beyond. The distance from Amos to lake De Montigny is about 40 miles, and within this distance the river locally expands into three lakes which are known respectively from north to south as lake Figuery (or Peter Brown), lake LaMotte (or Jack Pine), and lake Malartic (or Seal's Home). The stretch of river between lake Malartic and lake De Montigny is locally called the Askigwaj River.

View of Lake De Montigny from Parker's Island.

"A" Shaft, Siscoe Mine.

The country along the water route is of low relief and heavily covered with stratified clay deposited in the bottom of a very extensive lake that, geologically speaking, recently occupied the region of the "Clay Belt" during the recession of the glacial ice-sheet. The valley of the Harricana River is well suited for farm lands and the Quebec Government, for the last five years has been encouraging colonization in that district. The region under consideration is situated just north of the height of land and drains into James Bay through the string of lakes and the Harricana River.

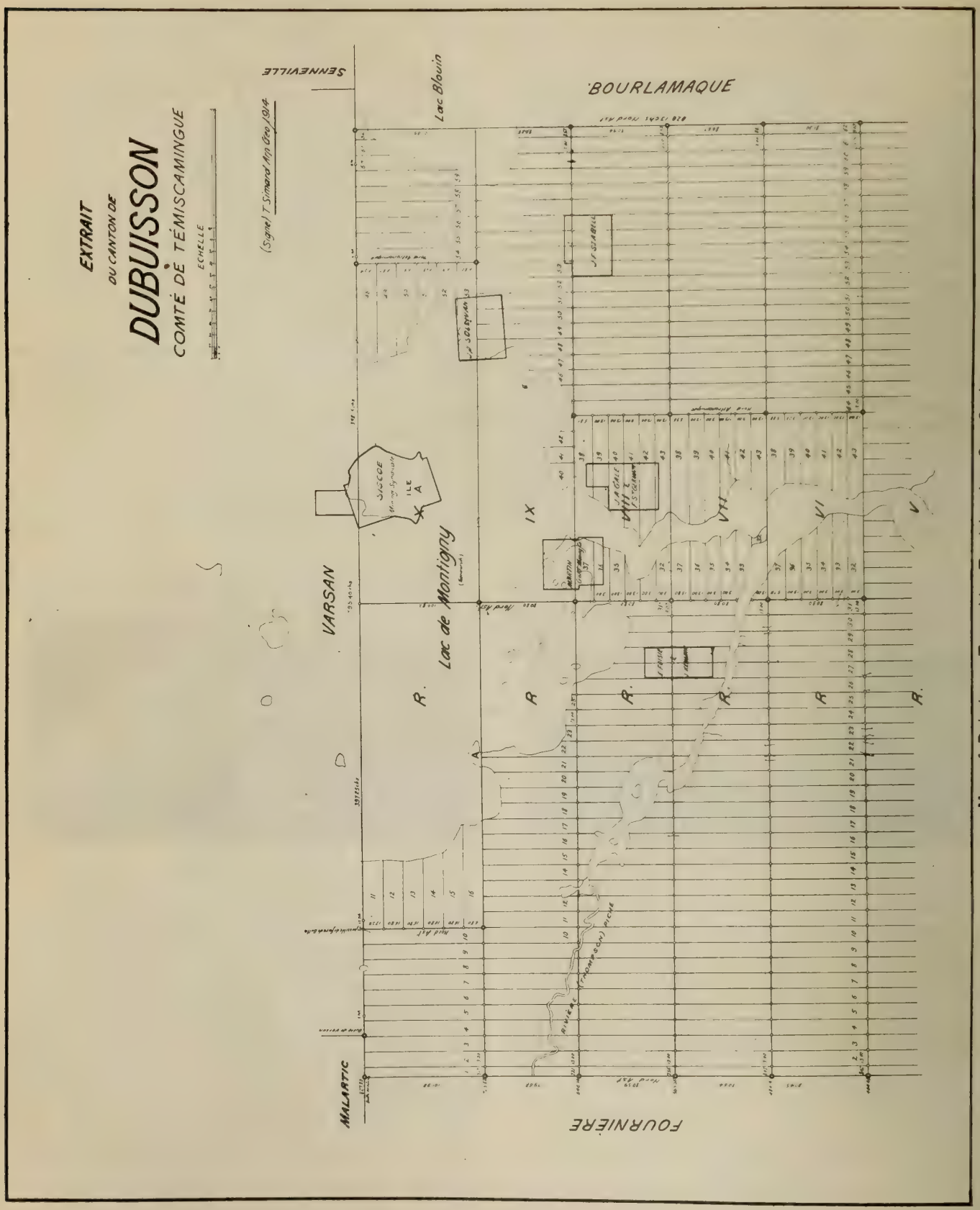
History of Discovery of Gold on Lake DeMontigny.

The first discovery of gold in that district was made in July, 1911, by Mr. J. J. Sullivan; he staked a claim on the eastern shore of lake DeMontigny which was developed as Sullivan's property during the following years. The discovery now owned by the Martin Gold Mining Company, Ltd., was made the same year, with two other gold bearing veins. * In 1915 gold was discovered on the claims now held by the British Minerals Corporation, Ltd., on the largest island in the lake, known as Siscoe Island. Apart from the work done on the latter claims by the Siscoe Mining Syndicate and on the Martin property, there was practically no prospecting done in the district during the war. Since the signature of the armistice numerous prospectors were attracted to the neighborhood of this lake and made some gold discoveries among which the more promising are the following: Stabell, Foisie, Craft, St.-Germain-Gale, Legault, Parker, Caron, Marsil, Clowse and others.

General Geology.

The Lake DeMontigny area is underlain by a series of Keewatin rocks formed mainly of fine-grained green chlorite and hornblende schists. Some of these schists are altered diabase and diorites. Numerous exposures of this green schist can be seen on the southern, eastern, and western shores of the lake as well as in almost all the islands in the lake. Altered basalts showing the pillow or ellipsoidal structure are also common, inter-bedded with the green schist. Good examples of this structure can be seen just west of the Martin shaft, on the Stabell claim, and on the Clowse claim. Cutting these greenstones are a few intrusions of peridotite, granodiorite, and diorite. The former forms part of the two islands just west of Sullivan's property. The granodiorite occupies the whole out-crop of about one-half square mile on Sullivan's property. The diorite forms the country rock of the northern part of the Siscoe Island where the shaft "D" is located. These instrusions probably belong to the Laurentian volcanic activity. Besides these instrusions the country is traversed by numerous dykes of porphyry containing feldspar phenocrysts the size of a pea in a grey or green groundmass. One of these dykes was seen cutting the granodiorite on Sullivan's property and they probably represent subsequent volcanic activity. South of the Thompson River the country is

* See Report on the Geology of the Headwaters of the Harricana River," by Dr. J. A. Bancroft, Report of Mining Operations in P. of Q. for 1912, pp. 217-229.



Map of Dubuisson Township, Temiskaming Co., Quebec.

underlain by the Pontiac schists and in Lacorne township the Laurentian granites and pegmatites are well developed especially at the south-west corner of the township where the pegmatites and the granite contain veins of molybdenite which have been opened up by Mr. Benjamin of Montreal.

Economic Geology.

Sullivan's Claims.

These claims are situated on the eastern shore of the lake and occupy part of lots 48, 49, 50 and 51, range IX, and part of lot 53, range X, Dubuisson township.

"C" Shaft, Siscoe Mine.

It is on these claims that gold was first discovered in July, 1911, by Mr. J. J. Sullivan. The veins are cutting a boss of granodiorite underlying the northern part of the claims. This boss forms a rounded outcrop having about 1,500 feet diameter. The work done upon these claims consists of trenches, test pits and a shaft of 18 feet deep. The veins vary in width from a few inches to 5½ feet. Some ten different veins, or croppings of mineral-bearing rocks, have been found on these claims up to the present time. The strike of the veins varies from due east and west to N. 70° W. Two small outcrops (Nos. 9 and 10) run northwest.

During the summer of 1912 considerable prospecting was done and three new veins roughly paralleling No.

"D" Shaft, Siscoe Mine.

1 vein were discovered and partly stripped. A test pit 10 feet deep was also sunk on No. 1 vein. In March, 1914, work was resumed on the claim and new buildings were erected on the property. Stripping of the surface was continued and new discoveries were made. At the same time test pits and open cuts were made on the different veins, and two shafts, one on No. 4, the other on No. 1 vein were started. These had reached a depth respectively of 9 feet and 18 feet when work was stopped at the outbreak of the war in August, 1914. No other work has since been done on the claims except prospecting and assessment. Most of the work was done on veins Nos. 1, 2, 3 and 4, and it is said that good returns were obtained from the assays. The British Minerals Corporation, Ltd., of Montreal, have taken an option on the property and it is expected that this company will resume work in the near future.

The Martin Gold Mining Co., Ltd.

This company who own parts of lots A and 37, ranges VIII and IX, of Dubuisson township, have a shaft sunk to a depth of 125 feet with over 100 feet of cross-cut and drifts on a gold bearing deposit which has been uncovered at the surface for 700 feet. The vein occurs in the Keewatin greenstones presenting an ellipsoidal structure. An intrusive dyke of feldspar porphyry cuts the Keewatin and roughly parallels the strike of the vein; this intrusive is 50 feet in width where exposed 30 feet west of the vein on the lake shore. The general strike of the vein is S. 45° E. and its dip is about 75° towards the northeast. The vein has been exposed over a distance of 700 feet by stripping and trenching, and its width varies from 2 to 10 feet. It is formed of a bluish banded quartz with inclusions of greenstones. Both the quartz and the adjoining rocks are mineralized, and visible free gold occasionally occurs in the quartz. The shaft has been started on the vein and sunk vertically to a depth of 125 feet. The foot-wall of the vein leaves the shaft

Martin Gold Mining Co., Shafthouse and Mill Buildings.

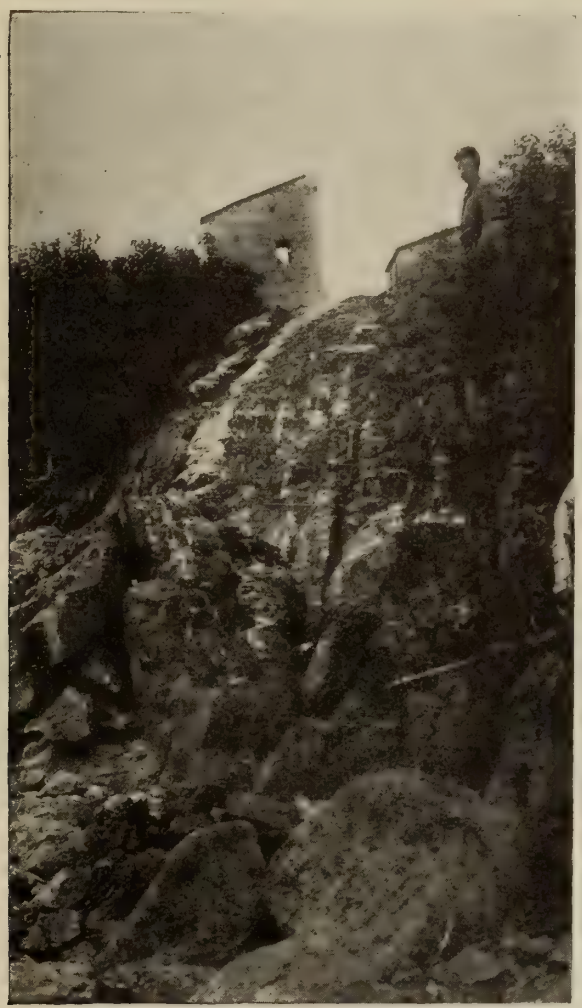
at a depth of about 35 feet. At the bottom of the shaft a cross-cut of 10 feet was driven to catch the vein and a drift was run on the vein 50 feet in a northerly direction and 25 feet in a southerly direction. The width of the vein in the drift is 11 feet. In 1918 the company built a small milling plant, for experimental purposes, near the shaft house. The ore is hoisted in a bucket containing about 600 lbs. and emptied in a small ore-car which is trammed over a trestle to the mill. The ore is passed through a jaw crusher, put into a bin of a capacity of 25 tons, which feeds a 10-stamp battery. The pulp passes over 3 amalgamated plates measuring 4 feet by 6 feet. Milling operations were carried on during part of the summer 1918, but the resulting gold was not disposed of. The ore is said to yield good values. The mine development work was discontinued during July of the present year on account of financial difficulties.

The Siscoe Mine.

This property, which is now operated by the British Minerals Corporation, Ltd., is situated on the largest island on lake DeMontigny occupying an area of 360 acres. The island is underlain by a complex of more or less altered igneous rocks of the Keewatin forma-

tion. The northern part of the island is formed of diorites or andesites and diorite- porphyrites and the rest of the island is formed of greenstones and ellipsoidal basalt. All these rocks are locally cut by irregular dykes which possess the composition of quartz porphyrites.

The gold occurs in quartz veins and stringers, containing much tourmaline, with a little calcite and considerable disseminated pyrite. In one of the veins (the "C" vein) scattered grains and small lumps of scheelite have occasionally been encountered. Four principal veins have been prospected which are known as veins A, B, C and D.



Gold-bearing Vein on the Martins' Property.

On vein "A" a shaft of 45 feet has been sunk on the vein which is practically vertical down to this depth. The vein has been uncovered by stripping for a length of 90 feet.

The shaft at the "B" vein is 32 feet deep, sunk at the contact of a dyke of quartz porphyry, 8 to 10 feet in width, traversing the Keewatin greenstone.

On vein "C" a shaft has been sunk to a depth of 100 feet on a slope of 35° which corresponds to the dip of the vein. The vein at the bottom of the shaft is 22 inches wide. Dr. J. A. Bancroft, who reported on the property this spring for the British Minerals Corporation, Ltd., took four samples across the vein at depths of 41 and 47 feet and had returns of $0.80, $8.00, $21.60 and $33.00 per ton in gold. Dr. Bancroft considers this vein the best that has been discovered on the property.

The "D" vein zone includes a vast number of widely scattered irregular veins and stringers of quartz which rarely exceed a few feet or yards in length. These veins traverse the Keewatin greenstones, possessing the composition of an andesite or fine-grained diorite. In a few places, irregular dykes of light gray quartz porphyry, a few feet in width, traverse the greenstone. Several of these quartz stringers carry "nests" or "pockets" rich in free gold from which spectacular specimens may be taken. This zone was carefully sampled this summer by Mr. John A. Dresser and Professor J. W. Bell of McGill University. In one instance, a bulk sample weighing 8.3 tons was crushed in a stamp mill and amalgamated with the return of $39.64 per ton in gold. This bulk sample consisted for the most part of clean quartz showing an occasional speck of visible gold. In their opinion "the prospective value is sufficient to warrant undertaking further development work, especially taking into consideration the fact that the network of stringers in "D" zone and the "C" vein itself dip towards each other, the possibility of their being related is a matter which merits exploration. This work should be concentrated on the area between C and D and on the D zone. It would be most economically done in the first instance by diamond drilling, say to the amount of three or four thousand feet."

The J. F. Stabell Claim.

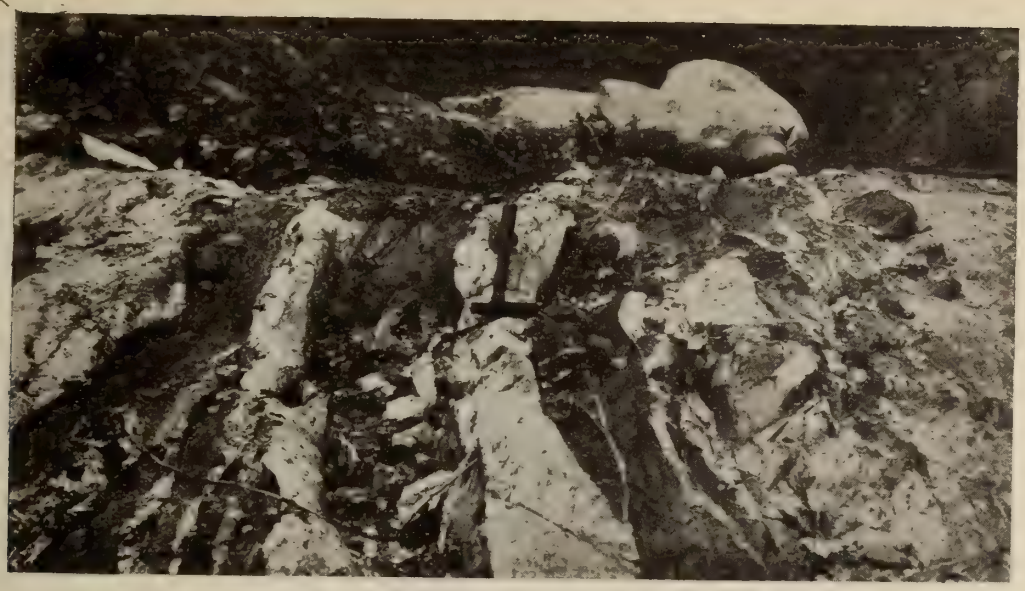
This claim comprises the northern half of lot 53, range VIII, Dubuisson township. A vein varying in width from 2 to 30 feet has been found running across the claim with a strike of N. 40° W., over a distance of about 700 feet. This vein is formed of stringers of quartz interbanded with schist. On the surface the rock is heavily rusted with decomposed iron pyrites forming the gossan. The same vein was found extending towards the west on J. B. Legault's claim. The prospecting work consisted in trenching and stripping on the surface. It is said that one of the prominent operating companies in the Porcupine district has taken an option on this property and will soon start diamond drilling.

The Foisie-Kangrow Claims.

These claims are situated between lake DeMontigny and the Thompson River, lots 27 and 28, ranges VII and VIII, Dubusson township. This claim was staked in early part of June this year and a very promising gold deposit was found by the stakers while making their assessment work. The vein outcrops near the corner post of lots 27 and 28, on range line between ranges VII and VIII. It strikes N. 45° W. and has an average width of about 10 feet. The vein matter is formed of blue and white quartz containing pyrite, chalcopyrite, stibnite, and particles of free gold. It has been uncovered by stripping and trenching for a distance of about 200 feet. There exists in the vicinity of the vein an intrusion of quartz diabase. Mr. Edmond Bregent, mining engineer of Montreal, has taken an option on the property and contemplates to open up that property this fall.

The St.-Germain-Gale Claim.

This claim occupies parts of lots 38, 39, 40, 41, 42 and 43, range VIII, Dubisson township. Three veins have been discovered on it. Vein No. 1 has a width of 35 inches at the bottom of a shaft 18 feet deep. Vein No. 2 has a width of about one foot and a shaft 10 feet deep has been sunk. On vein No. 3 the rock excavation is about 6 feet deep and the vein is only a few inches wide. Spectacular free gold is often found in these veins.



Marsil Vein—Showing interbanded quartz with schist and granite. Total width mineralized zone is over 80 ft.

Stabell Vein and Porphry Dyke.

Gold Bearing Vein on Craft Claim.

Ellipsoidal Basalt on Martins' Property.

The Foisie Kangrow Vein, Stripped.

Other Properties.

There are a few other properties upon which gold bearing veins have been discovered and which are actively prospected by the owners. The most interesting are: J. B. Legault's claim, lots 51 and 52, range VIII, Dubuisson township; this claim is adjacent to Stabell claim, and outcroppings show the continuation of what is thought to be the Stabell vein which has been described above in this article. The Parker claim and the Caron claim occupy a few islands along the southwest shore of the lake. On each of these claims gold-bearing veins have been found. The Marsil claim, situated on lots 39 and 40, range I, Varsan township, the Manibal Claim, lot 35, range VIII, Dubuisson, the Neuveu claim, parts of lots 44 and 45, range VIII, Dubuisson, the Craft claim, part of lots 44 and 45, range VIII, Dubuisson, the Carriere claim, lots 40, 41, 42, range IX, Dubuisson, are the most promising among the others.

EXHIBIT OF THE ONTARIO DEPARTMENT OF MINES.

At the Chicago Exposition of Chemical Industry, Septr. 22nd.

The Ontario Department of Mines is to be congratulated on the comprehensive nature and the excellent selection of the minerals shown at the Exposition of Chemical Industry in Chicago. The exhibit attracted much attention, and from varying grades of visitors, and Ontario's mineral wealth received wide advertisement. A fairly complete list of the exhibits follows:

Sphalerite—Big Duck Lake, north of Schreiber.

Gold ores—Miller-Independence; Tough-Oakes, Kirkland Lake; Hollinger Mine.

Copper Ore—Mine Centre.

Iron ore—Magpie Mine (siderite); Moose Mountain (magnetite, also briquetted ore); Lanark County (hematite).

Pyrite—Canadian Sulphur Ore Co., Queensboro; Nicholls Chemical Co., Goudreau.

Nickel Ore—Mond Nickel Co., Levack Mine; pyrrhotite, Mond Nickel Co., Alexo Mine, Porquis Junction; copper-quartz ore, Mond Nickel Co., Bruce Mine; furnace matte, nickel-copper, Mond Nickel Co.; Bessemer matte nickel-copper, Mond Nickel Co.; nickel and copper sulphates, Mond Nickel Co.

Galena—Jas. Robertson Mine, Galetta.

Molybdenite—Eastern Ontario.

Nickel Ore—Creighton Mine (showing pentlandite crystals); Ingot Nickel, International Nickel Co.

Nickel preparations (sulphate, carbonate, oxides); nickel shot—International Nickel Co.

Silver—Large slab of native silver from Coniagas Mine.

Bar Silver Bullion.

Cobalt bloom.

"Stellite" metal, cobalt-tungsten, chrome alloy, Nickel and cobalt oxides, Arsenic, Metallic cobalt and nickel—Deloro Smelting & Refining Co.

White and metallic arsenic—Coniagas Reduction Co.

Nickel carbonate, metallic cobalt, cobalt acetate, cobalt hydroxide, cobalt sulphate, nickel and cobalt oxides—Metals Chemical Co., Welland.

Ferro-silicon—Electro-Metals Co., Welland.

Cyanimide; nitric acid, urea, ammo-phos (fertilizer), ammonia aqua, ammonia sulphate, ammonia nitrate, dicyandiamid—American Cyanamid Co.

Soda and soda-ash—Brunner-Mond Company.

Gypsum (and number of plaster products)—Ontario Gypsum Co., Caledonia.

Oil shale—Kettle Point, Lambton, C.

Barite—Premier-Langmuir Mine, Connaught Station.

Apatite—Hastings Co., Eastern Ontario.

Yellow ketone oil, acetic acid, wood alcohol, sodium acetate, hardwood creosote, acetate of lime, acetone alcohol, acetone (pure), charcoal, formaldehyde—Standard Chemical Iron & Lumber Co.

Salt (brine, and all grades), caustic soda, bleaching powder—Canadian Salt Co., Windsor.

Marble samples, polished—Bancroft.

Graphite (large block of amorphous graphite, with graded qualities of prepared graphite—Black Donald Graphite Co., Calabogie.

Talc—Geo. H. Gillispie Co., Madoc.

Abrasives (aloxite, artificial carborundum, corundum)—Craigmont, Ont.

Fluorspar—Madoc.

Mica—Lacey Mine, Sydenham. An extremely fine crystal, measuring about 17 by 24 inches.

Feldspar—Richardson Mine, Verona.

Brick Clay—Mattagami River, north of Transcontinental Railway.

BRITISH COLUMBIA CORRESPONDENCE.

Trail B. C.

The Consolidated Mining & Smelting Company is considering plans for the installation of two concentrating plants, one at Rossland B. C. and the other at Kimberley B. C.. The Kimberley installation is said to contemplate a plant having a capacity of 10,000 tons daily at the outset and possibly the erection of another unit of the same size, which would make the total capacity 20,000 tons. If the project thus outlined is carried through the concentrator would be the largest on the continent. The nearest approach to it in this respect is said to be a plant in the State of Utah, which is capable of handling 15,000 tons a day. The several plants of the Anaconda Copper Mining Company, Montana, it is pointed out. take care of 15,000 tons daily. Plans for the Rossland Plant have been under consideration for some months. It was proposed at first to provide a 1500 tons plant but recent reports are that the Company now has in mind a 5,000 ton installation. The chief problem at Rossland has been a source of water.

The City has the first right to a supply but has shown a disposition to share it liberally with the smelting company. The construction of a dam in the mountains near Rossland, it is believed, would take care of this need, although there is no doubt that the expense of the undertaking would be considerable. The proposed site of the Rossland Concentrator is between the War Eagle and the Le Roi Mines and the sources of ore would be the Le Roi, War Eagle and Centre Star Mines, which are the property of the Consolidated Mining & Smelting Co. In these are large reserves of low grade copper-gold ore. At Kimberley the chief ore supply will come from the Sullivan Mines of the Consolidated Company. From these properties from 2,000 to 4,000 tons of lead and zinc ore are shipped weekly, the output for the last eleven days of the month of August being 6,537 tons of zinc and 630 tons of lead. In addition to this ore, which is of smelting grade, the mine contains an enormous quantity of ore carrying zinc and lead in lower percentage. Its removal at a profit was a problem until a year about when it was announced that it had been solved by the metallurgical staff of the Company at the Trail Smeltery.

RUBBER FITTINGS OF BREATHING APPARATUS LEAK IN PRESENCE OF GASOLINE.

James S. Cunningham, Denver. Col., one of the rescuers of the Bureau of Mines, Department of the Interior, and attached to Mine Safety Car No. 2, met death in a storage gasoline tank of the Sinclair Oil and Refining Company, at Trinidad, Col., Monday, August 25. It is thought that while attempting to connect some pipe fittings in the bottom of the tank, his half hour oxygen breathing apparatus touched the gasoline in the bottom of the tank, the rubber in the breathing bag dissolving in the gasoline and allowing the fumes to enter the apparatus.

Commenting on the cause of the fatal accident, and entirely aside from the grief over the loss of a brave rescuer, George S. Rice, chief mining engineer of the bureau, said: "The accident brings out strikingly the serious risk, not previously understood, that is undertaken when a gasoline tank is entered, using the ordinary breathing apparatus in which rubber has been an essential part of the apparatus. As the necessity to enter a partly filled tank to make repairs arises not only on shore but also aboard ship, the Bureau of Mines will make inquiry of the principal refineries and wherever storage tanks are used regarding the frequency with which such conditions are met to establish the importance of the development of a type of apparatus which does not use rubber parts."—"Coal Industry," Pittsburgh.

A New Discovery of Pitchblende

By CYRIL W. KNIGHT.

It having been reported to the Ontario Bureau of Mines that pitchblende, extraordinarily rich in radium, had been discovered in Butt township, east of the Georgian Bay, in the Province of Ontario, the writer was instructed by Thos. W. Gibson, Deputy Minister of Mines for Ontario, to visit the area and make a preliminary examination. Accordingly, two days were spent early in October in this township, and one or two ounces of pitchblende were collected.

The mineral was identified and found to be pitchblende by M. K. McNeill, Provincial Assayer for the Province of Ontario. He also found that it was strongly radio-active.

Butt township is entered by way of Kearney, a town on the Grand Trunk Ry. 167 miles by rail north of Toronto and 6 miles east of Scotia Junction. The deposit of pitchblende is 22 miles north-eastward from Kearney. A wagon road leads to within 4 miles of the occurrence, and the last four miles must be travelled on foot. It may be added that teams, wagons and supplies are obtainable at Kearney for those who desire to visit the area. Hotel accommodation is available at Scotia Junction and Kearney.

The country along the wagon road into the deposit is for the most part rugged, particularly in Butt township. The hills rise two or three hundred feet or more above the valleys, the latter being filled with sand and gravel. In that part of the township in which the pitchblende occurs, the rocks are largely covered with drift, making prospecting difficult. Mica has been mined in a small way in this part of the country, on and off, for years.

The pitchblende occurs sparingly in a coarse, granite pegmatite dike, striking north 25 degrees east, and dipping at about 60 degrees to the northwest. The dike has been worked by an open cut about 40 feet long, and 7 or 8 feet deep. It occurs at the edge of a small lake, locally known as Mica lake, on lots 13 in the sixth and seventh concessions of Butt township. The lake has been partly drained in order to prevent the pit being flooded during mining operations.

The width of the dike is not known, since only the foot-wall has been exposed by the pit, but it appears to be at least three or four feet wide. The length of the dike is also not known, the surface being covered with drift; the open cut shows it to have a length of at least 40 feet.

The dike consists of white feldspar, red feldspar, white quartz, smoky quartz, white mica, black mica, a little tourmaline, pitchblende, and other minerals in small quantity, which have not as yet been identified, but which are being investigated by the Ontario Bureau of Mines.

The pitchblende appears to be associated with the red feldspar, in which respect it resembles the occurrence of euxenite, a radium-bearing mineral, in Lanark county, Ontario, described in the 26th annual Report of the Bureau of Mines, 1917. The euxenite of Lanark county also occurs in a coarse granite pegmatite dike.

Little need be said concerning the general geology of this part of the Province of Ontario. The country rock is pre-Cambrian in age, and consists of banded gneisses, such as granite gneiss, mica gneiss, quartzite gneiss, etc., etc. These banded gneisses cover a great area, extending as they do from the Georgian Bay eastward to the Province of Quebec, and from about Lake Timagami southward almost to Lake Simcoe, a distance of some 150 miles. The gneisses are everywhere cut by numberless dikes of granite pegmatite. It is in one of these dikes that the pitchblende in Butt township and the euxenite in Lanark county occurs. The number of coarse granite pegmatites is so great in the Province of Ontario as to encourage the hope that pitchblende or some other radium-bearing mineral may be found in large quantities.

The pitchblende in Butt township was discovered by Mr. Wm. Elliott who has worked the deposit for mica from time to time during the past three years. About a ton of mica has been mined and shipped. Mr. Elliott noted the presence of a black, heavy mineral which he eventually forwarded to Ledoux & Company of New York City, who gave him the following report, sample No. 1 being the mineral itself, and sample No. 2 the feldspar in which it occurs:—

	Per cent.
No. 1 Uranium	63.60
Equivalent to Uranium Oxide (U_3O_8)	74.98
No. 2 Uranium	0.35
Equivalent to Uranium Oxide (U_3O_8)	0.42

Sample No. 1 appears to be pitchblende; it contains approximately 10 per cent of lead. The radio activity as determined by the electroscope is very high. Calculated at the usual Uranium ratio, the sample contains Radium in the proportion of about 190 milligrams per ton. It is impossible to even approximate the value of such extraordinarily rich ore since there are no established quotations. We think you would be safe in taking $3.00 per pound for the Uranium Oxide contained as a minimum which would give a value of about $4,500.00 per ton of 2,000 pounds.

Sample No. 2 is too low grade to be of any commercial value."

The pitchblende in the township of Butt occurs in grains about the size of peas or larger. Mr. Elliott reports that he has found the mineral occurring in masses as large as an egg.

This is the second occurrence of radium-bearing material in Ontario reported since the Legislature in 1914 offered a reward of $25,000 to the first discoverer of ores or substances containing radium in sufficient quantity for commercial extraction. The reward has been claimed in respect of both discoveries, but so far the conditions have not been met, in that radium has yet not shown to be present in commercial quantity.

Mr. T. J. Brown, General Superindendent of the Nova Scotia Steel Company at Sydney Mines was present at the dedication ceremonies of the Research Laboratories of the United States Bureau of Mines at the end of September. Mr. James MacMahon, First-Aid Director of the Dominion Coal Company, and in charge of that Company's Rescue Station, was also a visitor on this occasion.

ORGANIZATION OF SUDBURY BRANCH OF THE CANADIAN MINING INSTITUTE.

The Sudbury Branch of the C.M.I. was organized on September 4th. The following officers were elected: E. J. Corkhill, Chairman; R. H. Hutchinson, Secretary-Treasurer; E. J. Carlyle, O. Hall and E. A. Collins, Committee.

It is proposed to hold a series of regular meetings of the Branch, with special meetings as often as suitable speakers are available. The meetings will be quite informal and will take the form of a luncheon, followed by a program.

The first meeting occupied the afternoon and evening of October 4th and took the form of a visit to the smelter and other buildings of the British America Nickel Corporation, at Nickelton a banquet at the Nickel Range Hotel, and a very fine lecture on the Rio Tinto mine, Spain, by General Manager W. A. Carlyle of the B. A. N. C., with musical program.

Visit to B.A.N.C. Plant at Nickleton.

The visit to the works at Nickleton was made by members of the Institute and a number of Sudbury citizens interested in mining who had been invited to make the trip. The magnitude of the works, together with their completeness in every detail, came as a revelation to the visitors. The party was conducted through the smelter, power house, shaft house, converter and furnace buildings, dry house, and various buildings, by Manager Carlyle, Capt. Hibbert, and other officers of the company. The trip to Nickleton was made on a special train at 2.30, the visitors returning about six o'clock. Several million dollars have already been expended at Nickleton, and the construction work is rapidly nearing completion. What struck the visitors most was the solid and substantial construction of buildings, the modern mining and smelting machinery, the automatic stokers in the engine room, the layout of the yards and tracks, and the methods employed to ensure the safety of the workmen, together with the provision made for expansion should circumstances warrant after the producing stage has been reached. During the afternoon a visit was paid to the huge dining hall which accommodates several hundred men for dinner daily, and a luncheon of sandwiches, cake and coffee was served to the visitors. The plant installed for preparation of food, it was told these present, was well equipped with everything required to meet the demands of the many workmen.

The Meeting a Success.

That the meeting of the Institute branch was successful beyond all expectations is certain. At the supper in the Nickel Range in the evening President Corkill stated that he had been at many meetings of branches of the Institute in Canada, but never before had he seen so large an attendance at any branch meeting. He was convinced that a mistake had been made in not organizing an Institute branch in this district long ago as a means of bringing mining men together. Ammouncement was made that letters had been received from Hon. Mr. Ferguson, minister of lands, forests and mines, expressing regret at being unable to be present on this occasion, also from the deputy minister, W. T. Gibson. Both men wished the new Institute branch all success, and expressed the hope that they would be able to visit Sudbury on some future occasion. President Corkill invited all members of Institute branches in other places to join the district branch.

Banquet and Lecture.

Returning from the works at Nickleton a banquet was held in the Nickel Range Hotel, followed by a lecture on the Rio Tinto mine in Spain, given by General Manager W. A. Carlyle, of the B.A.N.C., Ottawa. To the banquet in addition to the visiting mining men, were invited a number of local men, including Mr. Chas. McCrea, M.L.A., Major D. M. Brodie, W A. Evans, Mayor Morrison and others. A prominent guest was Mr. J. B. Tyrell, expert geologist for the Dominion government, who was passing through from Winnipeg, coming in on invitation of Institute officials.

Mr. Carlyle's description of the Rio Tinto Mine illustrated by lantern slides was enthusiastically appreciated by a critical audience, and the votes of thanks given to Mr. Carlyle and to Rev. Wm. MacDonald for the loan of the lantern, were well deserved.

Chairman Corkill announced that the Institute intended holding another similar gathering one month hence. It would take the form of a luncheon and a visit would be made to some part of the district.

About 75 persons took part in the excursion and 90 attended the dinner. The Secretary of the Sudbury Branch says the members "are out for the livest Branch in Canada," and the "Journal" wishes them good luck.

THE MONTREAL BRANCH OF THE C.M.I.

A meeting of the Montreal Branch of the Canadian Mining Institute was held at headquarters on the 10th October in the evening, Prof. Bell in the Chair.

Business included election of branch officers, nomination of councillors for the province, and arrangements for the winter's meetings.

Capt. J. G. Ross was elected as Chairman of the Branch and Capt. Kemp as Secretary. A vote of thanks was given to Mr. Graham, the retiring Secretary.

Dr. Adams, the Acting Principal of McGill University, mentioned that the mining classes at the University were larger than for some years past, and not this alone, but the quality of the students was unusually good. He looked forward to a very successful year in the mining classes.

Dr. Bell said he had received a letter from Mr. Eugene Cowles, who is now in South Africa, which, among other matters, mentioned that there was a real dearth of qualified mining men on the Rand, and a number of openings for such men should the supply of positions in Canada be less than the number of applicants.

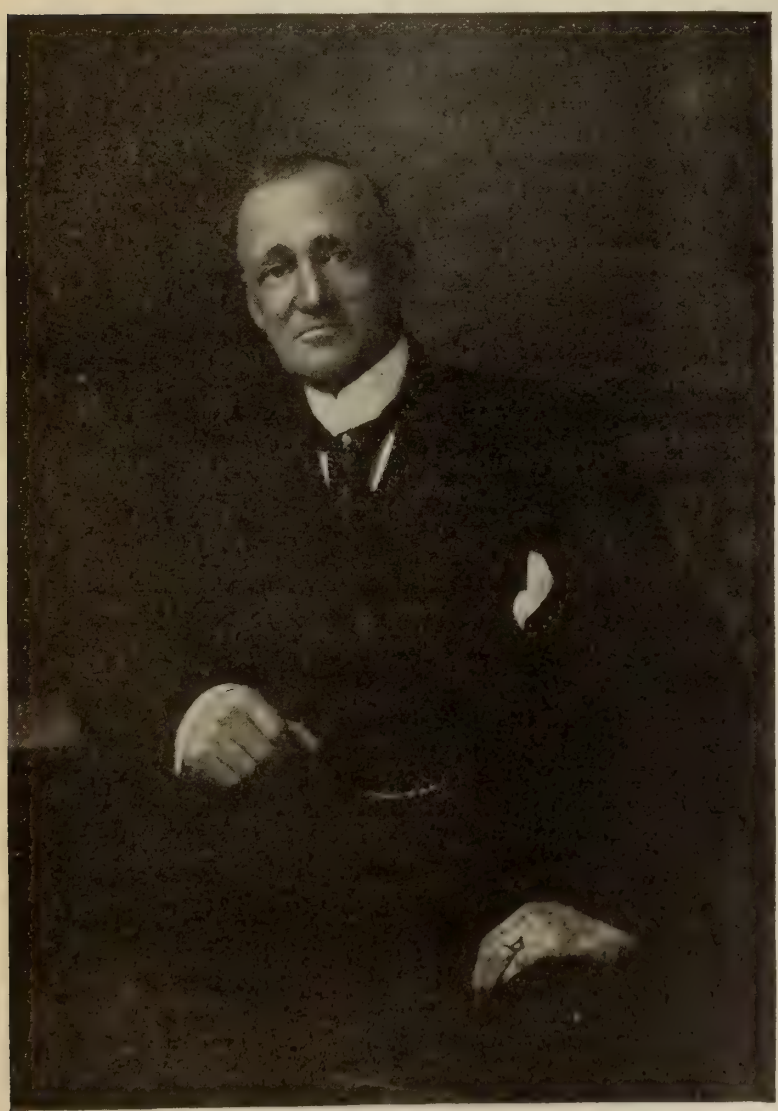
The attendance at the meeting was good, but Capt. Ross, the Chairman elect, was unable to be present, and discussion regarding the winter's programme was deferred. It is suggested the meetings will take the form of a monthly dinner, followed by a meeting.

Mr. C. A. Magrath, late Fuel Controller of Canada, touches the heart of the coal problem in Canada when he describes is as being largely one of transportation, and the purchase and storage of coal in the Summer season. Canada because of climatic conditions has an open and a closed season of transportation, and as the three central provinces of Canada have no coal deposits, they must make transportation fit in with the seasons, or be sorry that they did not.

CANADIAN COAL MEN.

Charles Montserrat Odell.

C. M. Odell was born in Sarnia, Ont. in 1861 In 1864, his father a pioneer engineer of the Grand Trunk Railway, came to Nova Scotia being employed on the Nova Scotia Railway, then being built from Halifax to Pictou. In 1879, C. M. Odell went to Winnipeg, where after two years of hard endeavour and study he joined the staff of the Canadian Pacific Railway, just formed, and went in 1881 to the Rocky Mountains as Assistant-Engineer, on the first survey party sent to the mountain section, running the first line of levels through the Kicking Horse Pass on the route that is now traversed by the Canadian Pacific Railway. In 1885, Mr. Odell came to Cape Breton and was engaged on Government surveys up to the completion of the Intercolonial Railway from the Strait of Canso to Sydney in 1891. In 1893, when the Dominion Coal Company was incorporated, Mr. Odell located the line of the Sydney and Louisburg Railway, and then left the Dominion Company for a short period, being engaged in coal mining and railway location in Inverness County, and in connection with the Coxheath Copper Mine and various local municipal water services.



C. M. ODELL.

In 1897, Mr. Odell returned to the Dominion Coal Company's service as Resident Engineer, and until the affairs of that concern grew so large as to require division into departments he was in charge of all the underground surveys, new construction, and general engineering.

Mr. Odell, therefore, may be justly styled a pioneer Canadian, having seen and assisted in the opening up of the country both in the West and in the East. With the Dominion Coal Company, his record of service is notable even among the permanent officials of a Company that has a good record in this regard, and it may be said that Mr. Odell located the Sydney & Louisburg Railway at the birth of the Dominion Coal Co. and has kept it in good order ever since. This road has probably the most intensive traffic of any single forty miles of track in North America, handling as it has done up to 35,000 tons of coal in one day, and its enviable freedom from accidents is sufficient evidence of the attention that had been paid to the maintenance of track.

As Resident Engineer, Mr. Odell's duties have included the adjustment of land damages, subsidence claims, and kindred matters involving intimate dealing with the local farming population and county and municipal officials, duties in which his encyclopaedic memory, and a justly celebrated gift for incisive characterisation, combined with a clarifying humor that illumines the most dry-as-dust rating appeal, or shortens up legal cross-examinations by dangerous repartee or a solemn reductio ad absurdum, have made his services of great value to the side on which he might be engaged. It may be said that the least of the failings of the inhabitants of Cape Breton is a lack of native shrewdness.

"Charlie" Odell's annual contribution to the proceedings of the Mining Society of Nova Scotia is a feature that always evokes pleasant anticipation, for it is his especial faculty to make wisdom sound like nonesense, and it will never be said of him, as was said of some solemn wise acres of old; "There is that which sayeth naught, and it is accounted unto him for wisdom."

We could tell tales of a wonderful motor craft known as the "See-em-Oh!" and of aquatic feats on the Mira River that would pale the yarns of Rougemont, but are they not written in the annals of the Royal Cape Breton Yacht Club? Nothing that we could tell of Charlie Odells' "feats on the fiord" can exceed the precise truth, and it may be left at that.

That Mr. Odell is a good engineer is not only attested by his record, but will be borne witness to by all who have tried to follow him along a blazed trail in the woods with a dial and a chain, or have tried to outwalk him up some two miles of a seven per cent grade underground.

All good engineers are traditionally inarticulate, at least the "Engineering & Mining Journal" says so, and the subject of our sketch is a good engineer, and he also is the author of an article which appeared in the C. M. I. Bulletin, June number, on "Romance and Rascality in Mine Promoting." There is a terminological inexactitude somewhere.

Letters patent have been issued to incorporate a new mining company in northern Manitoba, to be called the Laura Mines, Limited, with a total capital stock of $2,000,000. The mine is situated in the Rice Lake district.

NOVA SCOTIA NOTES.

Dominion Coal Company Opening a New Mine.

The Dominion Coal Company is opening the Emery Seam near the shore of Big Glace Bay Lake, at the rear of Caledonia Colliery. The area tributary to the new opening will be approximately the area which was tributary to the Caledonia Colliery in the Phalen Seam above, but will be about twice as large in extent because of the extension of the Emery Seam to its outcrop is almost half a mile in the rear of the Phalen Seam lying some 160 feet vertically above. The new mine it is reported will be known as the Victory Mine, No. 24. There are at present two openings on the Emery Seam, namely No. 10 and No. 11 Collieries situated approximately in the same relative position to the Emery Seam No. 5 (Reserve) and No. 3 Colliery on the overlying Phalen Seam.

The growing importance of the Emery Seam was noted in the last issue of the "Journal." It now has attained a production amounting to ten per cent of the output of all the Cape Breton Dominion mines, and its relative contribution is a growing one. Even yet, however, the Emery Seam is virtually a virgin area of coal, superficially much greater in extent than the Phalen Seam lying above, which last-named seam is largely exhausted of solid coal in the land area. Under the Emery again lie the Clarke, Martin and Mullins seams all successively greater in superficial area than the Emery Seam, because of their successive concentric outcrop. All these lower seams are included within the Dominion Coal Company's properties, and they extends seawards below the three seams now being mined in the submarine tract, namely, in successive order, the Hub, Harbour and Phalen seams.

The Emery Seam coal is a good steam coal, with a fairly large percentage of light flocculent ash that does not clinker. The coal is one that is washed with advantage. The sulphur present in the coal is apparently in such form that it can be removed by mechanical washing, and when so treated it makes a good metallurgical coke. The coal is also in good demand for locomotive and steamship bunkers, because the volatile constitutents are relatively low, and do not occasion soot deposition in burning.

In connection with the lower seam of the Glace Bay district, it may be of interest to quote from a chapter on this subject contained in Mr. F. W. Gray's description of the Dominion Coal Company's operations, written in 1907 when the Emery Seam was not being operated. Mr. Gray stated:—

"As the collieries on the Phalen Seam, such as Re-
"serve, Caledonia, and in fact all the older collieries,
"become depleted, the present plant will doubtless be
"used for mining the Emery and Gardiner (or Lor-
"way), and the life of these collieries may be con-
"sidered for the purposes of the present generation,
"as indefinitely prolonged."

"We may expect in Cape Breton as time goes on
"the same appreciation in the value of coalfields as
"has taken place in older countries. In England, for
"example, the thicker seams, such as the Barnsley
"Bed in South Yorkshire and the Thick Coal in Staf-
"fordshire, are being rapidly worked out, and seams
"are now being mined which were at one time entire-
"ly neglected. By the use of coal-cutting machines,
"electric power transmission, longwall face-convey-
"ors and general improvements in mining practice
"afforded by modern equipment, it has been found
"possible to successfully and profitably mine coal-
"seams that do not exceed sixteen inches in thickness.
"When it is considered, therefore, that there are in
"the Glace Bay Basin not less than six seams of coal
"practically untouched which are each over three
"feet in thickness, and that in addition to this the
"Coal Company's submarine leases in the Glace Bay
"Basin, the Lingan-Victoria tract and near Point Aco-
"ni, in the Sydney Mines Basin, are as yet almost
"virgin, it will be seen that there is not yet any need
"for anxiety as to the coal resources."

Minto Mines N. B. Conciliation Board.

A conciliation Board to enquire into the labour difficulties at Minto will sit on the 23rd October with Chief Justice McKeown as Chairman. The men are asking for weekly pay, pit-head scales and recognition of the union.

Toronto Mine of Bras d'Or Coal Company resumes Work.

The Toronto Mine of the Bras d'Or Coal Company near North Sydney has re-opened after a period of idleness caused by lack of orders. Contract for railway coal has been arranged with the Government.

BRUNNER-MOND CANADA, LIMITED.

The mineral exhibit of the Province of Ontario at the Chicago Chemical Exposition included samples of the products of the Brunner-Mond Company, which were from this company's United States plant. The Canadian plant is new, and will not be in operation until this month (October, 1919).

The new plant is expected to produce from 50 to 60 tons of soda-ash daily when operations commence, with an ultimate capacity of 125 tons daily. The company controls and will use a limestone deposit of unusual purity, namely, analysing 97 per cent calcium carbonate. The company holds 525 acres of ground, with four salt wells, and will employ on its works about 200 employees. It will generate its own electric power from turbo-generators, it being extremely important that the processes of manufacture should not be endangered by interruptions in power supply.

The Nichols Chemical Company, Northpines, Ontario, advertise that the Northern Pyrites Mines of this Company is resuming operations, and ask for applications for employment.

Vancouver B. C.

Recent reports by the Mines Branch, Ottawa, on the production of Mica in the Province of Ontario and Quebec and on the muscovite occurrences at Tete Jaune Cache and Big Bend Districts, British Columbia, has directed attention to the fact that the latter are as yet undeveloped and comment is made on the importance, from this point of view alone, of finishing the Pacific Great Eastern Ry. and thus furnishing the transportation facilities necessary for the opening up of these deposits.

SPECIAL CORRESPONDENCE NORTHERN ONTARIO.

Company Stores at Timmins Proving Beneficial.

The mining companies of the Porcupine district are making good their promise to reduce the cost of living. It will be recalled that at a conference of the employes and the employers, each faction recognized the futility of endeavoring to saddle the economic burdens of the day on the other, with the result that it was decided to establish company stores with the object in view of reducing the cost of living. Representatives of the mining companies declared it to be reasonable to expect a reduction of about eighteen per cent.

Several months ago a price list was compiled which is said to show the prices which then ruled. This list has been used as a basis from which to measure the result of the company stores. It now develops that a coupon good for $10 worth of life's necessities at last spring prices, may now be purchased for just $7 or a reduction of thirty per cent.

The system employed by the Hollinger and the McIntyre companies is the establishment of a store the management of which is placed in the hands of a man of proven experience in both wholesale and retail business, and supplies are sold at cost. The plan promises to be successful.

Provided workmen were available the mines of Porcupine could absorb two thousand or more at comparatively short notice. Toward this end it is believed not improbable that the companies and the Soldiers' Civil Re-establishment will be able to cooperate with the desired result in due time.

The Skead District Discoveries.

The gold discovery in the township of Skead is attracting wide interest. The find is perhaps the first one of importance to be made in this district by a returned soldier. The discoverer was Walter Manlay, of Haileybury.

Mr. Manley enlisted with the well-known Borden Battery in January 1915, being one of the sixty men picked from among prospectors of this district.

"Bill" Reilly, partner of Manley's, does not know that he is a partner in the rich gold find in Skead, for the reason that Bill left some weeks ago for the scene of the recent gold find in The Pas in Northern Manitoba and is not expected out to the railroad until the last boat down. Obviously, when he learns that such a prize awaits him, he will lose little time in reaching headquarters at Haileybury.

The Skead find has every appearance of being of at least equal importance as that which caused the rush to The Pas. The spectacular gold showings occur in a dike already found to be upwards of twenty-five feet in width, and compose of altered porphyry and intersected with veins of quartz. The gold occurs in the porphyry. So far, owing to the overburden being heavy, the full width of the dike has not been determined, although trenching to a depth of as much as sixteen feet has been carried on. The group of six claims, known as the Manley-Reilly Group, and in which Harry Crawford, of Haileybury is also interested having been given an interest for recommending the Skead area to Manley, is situated in lot 6 in the 6th concession of Skead. The claims had been previously staked, but their holder failed to do the necessary surface work to discover the gold which literally lay right at the very grass roots. The valuable ground was accordingly permitted to revert to the Crown, later to be re-staked by Manley, on behalf of himself and Reilly, the present owners.

Work on the Wisconsin-Skead is being carried on aggressively, drifting operations being carried in two directions at the 100-ft. level. Results obtaining are said to be favorable.

At the Crawford-Skead some surface work is being done, and arrangements are being made to do some sinking.

In addition to the spectacular gold find on the Manley-Reilly Group, promising gold finds have been made on other claims, including the Gorman-Meaney claims, as well as claims owned by Harry Martin of Montreal.

Lake Shore Mine.

Harry Oakes, president of the Lake Shore Mine, states that milling operations are to be resumed at the Lake Shore within the next few days. Some little time will be required to de-water the mine, but sufficient ore is on surface to keep the mill running for perhaps six weeks more, while, at the 100-ft. level of the mine sufficient ore is available on which to operate for at least several months and possibly a good deal longer. The mine is in such a condition that a force of less than thirty men is all that are required to produce at full capacity.

The dividend of 2½ per cent declared payable October 25th to shareholders of record October 15th will call for the disbursement of $50,000 and shows the extent of the confidence of the director in being able to get the mine back to a normal basis of production without difficulty.

Kirkland Lake District.—Statement by Manager of the Teck-Hughes Gold Mines.

Regarding the position of the mines in the Kirkland Lake district, a summary of the situation has been received from Mr. D. L. H. Forbes, manager of the Teck-Hughes Gold Mines, Limited, as follows:

"It will be recalled that the mines of this district (Kirkland Lake) were closed down on June 12th by a general strike which was precipitated on two days notice and in violation of the rules of the miners' union.

"With very few exceptions, the men employed at the Teck-Hughes and other mines here expressed themselves as being satisfied with the working conditions and not in favor of the strike. Nevertheless, these men quit work in sympathy with the rest rather than be branded with the ugly names used by the strikers. Almost immediately following the strike about nine-tenths of our former employees left the district to seek work elsewhere, while the few who were left here obtained work in various odd jobs such as road building, assessment work, and prospecting. In the face of this condition, we had no alternative but to minimize the loss from maintaining an idle mine and plant and to await patiently the turn of the tide.

"About the middle of September a movement among the business men and workers with families living in the district was started with a view to re-opening negotiations with the mines in order to have then start up again. As a result of this movement a conference between the mine managers and a Committee of the workmen took place at which the mine managers presented the workmen's committee with their wage schedule and a proposal for representation of the workmen in deciding the working conditions of the camp by means of electing committees from each of the operating mines. The stand taken by the mining companies in this matter was a determined one to the end that any

alterations and ajustments of the wage-scale or working hours must come as a result of conference and cooperation by the workmen actually in their employ and not as a result of a strike precipitated by socialist agitators most of whom were merely parasites on the real workmen of the district.

"The conference appeared at the time to appeal to the reason of the better elements of the handful of workmen left here but, when a vote by secret ballot was subsequently taken on the question of calling off the strike, the votes of the well known majority of the workmen were in some farcial manner, perhaps by the simple expedient of stuffing the ballot box, overruled by the socialist minority. At about the same time, the latter commenced an insidious propaganda to intimidate the workmen who wanted to return to work and to frighten away any man who might want to come in from outside to work.

"As the majority of the workmen left in the district were thus made unable to declare the strike called off, this and some of the other mines have taken it upon themselves to make it clear that a strike condition no longer exists. As about ninety per cent of our former employees are no longer available, having left the district, we are now starting to operate with a few of our former employees and with returned soldies to whom the arguments of the socialists have no appeal.

"The clique of socialists are endeavoring to dissuade these men from working here and, by the usual devices of placing pickets at the railway stations and along the road to Kirkland Lake, are trying to prevent men that we engaged at other places from coming in to work by calling them strike-breakers. Our answer to this is that the men we are now engaging are the real employees who will have permanent employment in this district, and, the socialists, by their unfair tactics and greedy scheme to create a monopoly of labor here, have forfeited any right they may ever have had to be considered as our workmen. To any of our former employees who may wish to return to work, we say the door is still open and you may disregard the loose talk and propaganda of the socialists with whom we will have no further dealings whatever. Our fight is not nor has it ever been, with unionism, as the term is now generally understood. On the contrary, we want to give our workmen an opportunity to cooperate with us in the upbuilding of the mining industry of this district. We have, however, taken a decided stand against the rabid type of socialism that has been preached by certain members of the community here and, as patriotic Canadians, are not going to have this poisonous social weed continue to grow in our midst. We therefore bespeak the support and influence of all those in the north country who feel as we do in this matter in counteracting any propaganda which may be set at work by the radical socialists."

Silver Shipments From Cobalt.

During the week ended October 10 six Cobalt companies shipped an aggregate of sixteen cars containing approximately 1,410,229 pounds of ore. The Nipissing with seven cars containing 630,479 pounds headed the list.

The following summary shows that ore shipments have been assumed such proportions as to compare favorably with any period during the past year or so:—

Shipper	Cars	Pounds.
Nipissing	7	630,479
Buffalo	3	263,155
McKinley-Darragh	2	190,875
Coniagas	2	129,927
La Rose	1	99,232
Beaver	1	96,561
Totals	16	1,410,229

During the corresponding period no bullion shipments were made. On October 11th, however, the Nipissing sent out 75 bars containing 100,482 fine ounces.

The Kerr Lake Statement.

During the fiscal year ended August 31st the Kerr Lake mine produced 1,482,649.40 ounces of silver, in addition to which was 90,586 pounds of cobalt and 137 pounds of mercury. This is inclusive of 154,682 ounces of silver on hand August 31st, 1918. Ore reserves are estimated to contain at least 500,000 ounces, as shown in the following explanatory paragraph:—"At the present time we do not consider it advisable to estimate ore reserves in detail inasmuch as it would be difficult to estimate with a reasonable degree of accuracy the future production of the property. However, under the present conditions, we estimate ore reserves to be approximately 300,000 ounces silver in high grade ore and 200,000 ounces silver in low grade milling ore, with a possibility of developing further values of real importance."

The report further states: "On July 23rd all miners of the Cobalt district went out on strike and although our men apparently had no grievance against the Company they struck with the other miners. This strike lasted until September 7th. On that date the miners returned and operations are now resumed."

Mining and development costs amounted to a fraction under 17½ cents an ounce, shipment and treating charges amounted to a fraction under 20 2-3 cents an ounce, while administration and general expense amounted to 2 4-5 cents an ounce, making a total cost of 40 4-5 cents an ounce.

Regarding development work, H. A. Kee, manager, states that during the year 2,382 feet of development was done by drifting, crosscutting and sinking, all of which failed to encounter new veins of importance, although commercial values were exposed in extensions of ore shoots, portions of which were previously located in known veins.

It is very interesting and encouraging to note that about two-thirds of production came from high grade ore, and that even of the ore in reserve about three-fifths is composed of high grade ore.

The financial statement shows that $600,000 was paid in dividends during the year in addition to which was $22,152.90 carried to balance, making a surplus of $657,641.43.

PLANNING LARGE MILL FOR ASSOCIATED GOLDFIELDS.

Details of Operations on Big Property at Larder Lake —Spent Nearly $1,000,000.—What Company Says.

"Associated Goldfields Mining Co., Ltd., Larder Lake, is undertaking something that has never before been attempted in Ontario, namely, mining large bodies of so-called low-grade ore on an enormous scale. Before the discovery of present-day methods of gold extraction this would have been an impossibility, but to-day such mines as the Treadwell of Alaska, working on ore that does not average over $2 per ton, and the Homestake Mines of Black Hill, South Dakota, where the ore does not run over $3 per ton, and the Rand Mine of South Africa (also low grade) are paying their shareholders millions of dollars in dividends yearly. Associated Goldfields assays have averaged well over $5 per ton.

This Ontario corporation (and the great body of its stock is owned in Ontario) was organized in 1914 by the amalgamation and purchase of several of Larder Lakes largest and most promising gold claims, altogether about 2,000 acres of properties, 1,600 comprising

actual claims, and the balance water-power rights-of way. Upon the advice of thoroughly competent mining engineers a plan of development and financing was inaugurated, and it is being consistently followed. This plan was to thoroughly block out the ore bodies on three of the properties, blocks "B," "C" and "D" formerly known as Harris-Maxwell, Kerr-Addison and Dr. Reddick Mine, respectively, by means of shaft sinking, drifting, diamond-drilling and surface exploration, and ascertain how much tonnage was in sight, and its actual value in gold content.

To do this required an enormous amount of money, and as the market was practically dead during the war it was decided to sell stock by private subscription, rather than list it on the open exchange (no money has been paid out for advertising), and the wisdom of their decision is proven by the fact that the bulk of the shareholders, numbering upward of one thousand, are composed of substantial business men and investors, who have either investigated and visited the camp themselves, or taken the advice of those who have, the list also including several mining engineers, contractors, men in charge of the work, a large percentage of the miners themselves and all salesmen selling stock.

Spent Nearly $1,000,000.

Almost one million dollars has already been spent in installing the water-power plant, over twenty-five miles of transmission line, forty miles of private telephone lines connecting the different properties, building sawmill, planing mill, bunk houses, installing machinery, and actually developing and blocking the ore bodies. The bunk houses just being completed at Block "B," to accommodate an additional one hundred and fifty men (over one hundred are now at work on the different properties) will be heated by hot water, have hot and cold baths and all accommodations, and it is planned to duplicate these at once on Blocks "C" and "D."

The actual development work consists of sinking a shaft on Block "B," the Harris-Maxwell (a hill of ore 1,000 feet long by 130 feet wide, rising 100 feet above lake level), to the 500-foot level, cutting an adit or tunnel directly across the body at the 100-foot level and drifting and cross-cutting through tunnels 8 feet by 7 feet for a distance of 1,500 feet at the 500-foot level, where the body has proven to be over 300 feet wide.

While for obvious reasons it is inadvisable for the company to publish its assay charts—and is not the custom to do so—its engineers have actual proof that every ton of ore can be run through the mill at a profit that compares favorably with other mines, and justifies it in planning a mill on the property that will handle 5,000 tons of ore per day, which is larger than any two mills in Ontario. This mill will be erected immediately the development and blocking out of the ore are completed, and the work is being pushed day and night.

Between seven and eight miles away, passing by over thirty of the company's other claims, is Block "C," a huge hill of mineralized rock or ore, 1,250 feet long, about 300 feet wide at the surface, rising about 300 feet above lake level, entirely free of overburden, and proven by means of diamond-drilling to be over 500 feet wide at the 500-foot level, and stated by engineers and men who knew to be one of the largest low-grade ore bodies in the world. It is now being explored by diamond-drilling and surface pitting and blasting, and from indications, every ton of this ore can be run through the mill at a profit, and the plan is to immediately erect a 5,000-ton mill here, which will also treat the ore from the Dr. Reddick, Block "D," which adjoins, and is a continuation of Block "C." On this property is located an air compressor capable of operating twenty-five drills, and the development work consists of sinking a 100-foot shaft and about 1,200 feet of drifting.

Gold for Canadian Coins.

"Block "D" is traceable on the surface for about 1,600 feet, and is in places 150 feet wide. It is said to enjoy the unique distinction of furnishing the gold from which the first Canadian coins were minted at Ottawa. The ore here is of a high quality, and some of the veins have proven to be over forty feet wide. Ore showing free gold is found here in abundance; in fact, it is to be found in all three bodies, over large and widely separated areas. While ore showing spectacular patches of free gold, as one critic puts it, does not make a mine, it is a pretty good indication that there is gold present, and justifies the opinion that there is more in the immediate neighborhood.

Metallurgists at Work.

Associated Goldfields assays have been taken from ore that does not show free gold, all such being discarded, and to do this work it has a modern chemical laboratory and furnaces right on the premises and under the direct supervision of Mr. A. J. Moore, a well known mining engineer, metallurgist and chemist, who has had charge of some of the largest mining operations in United States and Mexico. Mr. C. G. Dalmpre, also a man of wide experience, is general superintendent and manager of all the work, and the mine captains and foremen are all experts in their line.

The water power, which is estimated as capable of developing 10,000 h.p. without damming, will not only furnish all the power for running the mills, sawmills, electric cranes and shovels, lighting plants and so forth, but will also supply mines in the neighborhood at a profit which will actually make it a dividend-paying asset. The Huronia Mine is to-day using Associated Goldfields current.

Financially the company is now on a firm basis, with over $600,000 cash and Victory bonds in the bank and on hand."—Toronto "Globe."

Personals.

Col. H. H. Johnson, of the Tough-Oakes Gold Mines, has returned from England where he spent the past few weeks on business.

Mr. Dickson, manager of the Temiscaming mine has returned from a brief business trip to southern points.

Lady Rhondda Visits Peace River Country.

Sir Humphrey Mackworth, Viscountess Rhondda, and the latter's mother, Lady Rhondda, has returned after a trip through the Peace River Country, where the Viscountess has extensive coal properties, left her by the late Viscount Rhondda. While she has said little of a definite nature as to plans of development, it is understood that the Rhondda Corporation has important plans under consideration. It is reported that the British Columbia Government is to be asked to provide a good road over the Rocky Mountain portage to permit the introduction of motor trucks to partly solve the problem of transportation from West of the Mountain to Hudson's Hope.

BRITISH COLUMBIA.

The Collieries.

A new agreement has been entered into between the underground employees of the Canadian Western Fuel Company, of Nanaimo, B.C., and the company, the terms of which, under conditions prevailing before the war, would have been considered out of the question. Briefly the wages granted the miners represents an all-round advance as to the base day rate of 35 per cent and the continuance of bonuses, granted from time to time with the increase in the cost of living, amounting to $1.50 a day. The base rate for coal miners working by the day heretofore has been $3.15. Since the war started an increase has been allowed of 35 per cent, which subsequently was enlarged by three bonuses of 75c, 50c, and 25c. The pact now approved established a new base rate of $3.15 plus 35 per cent, or $4.25¼. This, of course, is unalterable. Allowance is made for present abnormal conditions as to the cost of the necessities of life by adding to the figure last named the total of the several bonuses referred to, namely, $1.50. This amount may be reduced as the cost of living declines. The situation of the coal miner who is put on day labor, therefore, is that he must get at least $5.75 a day. The fireboss receives approximately $6.42, which for a 30-day month would amount to $192.60.

These figures speak for themselves. In comparison with wages paid in pre-war days they appear startlingly large. And it must be remembered that they apply, not only to the Canadian Western Fuel Co., but to all the collieries of Vancouver Island and, in almost an equal degree, to those of other sections of the Province. A prominent official of the Canadian Collieries (D) Ltd., in discussing the wages question the other day stated, off-hand and in general terms, that the increase of recent years aggregated 72 per cent of the salaries paid before the war. It is interesting comment, in this connection, that the coal miners of Vancouver Island, who are unorganized and who have been getting along with their employers in an amicable manner, are doing slightly better than their fellow craftsmen of the Crow's Nest Pass District, who are well organized and who only a short time ago returned to work after a long drawn out and more or less indeterminate strike.

To return to the Canadian Western Fuel Company and its men, there are some of the terms of the agreement referred to which was signed by G. W. Bowen, managing director, and John Hunt, superintendent, on behalf of the company, and by the members of the Men's Committee, which are worth special attention. After outlining the wage schedule, a summary of which has been given, it describes the system of Dockage Inspection to be instituted at the Company's various mines; gives a schedule of pay for the loading of coal after machines; and then takes up the basis on which the men and the management propose to work in settlement of all possible disputes without rupture. The latter, probably better than any other clauses, illustrates the good feeling which exists between the employed and the employer in respect of this company. It reads:

"The company will meet the Agreement Committee, or a sub-committee thereof, on matters relating to this agreement, or any new matters changing the status thereof, or to adjust any matters in dispute between the employees and the mine officials, it being distinctly understood that there shall not be any stoppage of work by employees individually or collectively, pending the hearing of and adjustment of any dispute or grievance during the term of this agreement."

A date is set for monthly meetings between the management and the Agreement Committee; provision is made for the calling of special meetings; end it is declared that the agreement, which shall subsist for three years beginning October 1st, 1919,

"shall be binding upon and respected by the company and its successors, and also shall be binding upon and respected by all employees, who before accepting employment shall endorse the agreement by their signature in a book containing a copy of this agreement and kept in the company's office."

It also is provided that, in the event of a fatal accident in the mine, although no holiday will be permitted on the day of the funeral, those who wish may absent themselves from work. All employees in the mine in which the fatality occurred, and who work either on the morning, afternoon or night shifts of the day of the funeral, agree to contribute 50c per man and 25c per boy to a Joint Fund, the company undertaking to duplicate the total of the employees' contribution. The fund thus collected shall go either to the widow, or to the children under sixteen years of age if there is no widow, or to the mother, or to the father, should there be no widow or children, or, in case of there being no dependents, it shall go to the Medical Relief and Accident Fund of the Underground Employees. And it is clearly explained that relief from this source in no way affects claims dependents of employees might have under the terms of the Workmen's Compensation Act.

Henry Devlin, who has been an Inspector of Mines in British Columbia since February, 1913, has resigned in order to take a position with the Canadian Collieries (D), Ltd. Previous to entering the civil service, Mr. Devlin was mine manager at South Wellington, Pacific Coast Mines.

Dudley Michel, who for five and one-half years has been attached to the staff of the Department of Mines, British Columbia, as Instructor and Organizer in First Aid and Mine Rescue Work, has left the service. He is taking a position with the Giant Powder Company.

The Reserve Mine, Canadian Western Fuel Company, Nanaimo, B.C., recommenced operation on the 1st of September after a short period of idleness. David Brown has been appointed manager of the mine and Francis John. overman. With this property again on the producing basis it is expected that the output of the Western Fuel Company will show substantial increase.

THE METAL MINES.

Reneta, B. C.

A two drill compressor is being installed at the Mountain Chief Copper Property. Development is making good progress, states J. W. Evans, the manager. From the bottom of the shaft a drift is being carried both ways, and the ore has been exposed on that level for 25 feet. More of this work will be done before sinking is resumed. The bunkers have been filled again, a recent shipment to the Trail Smelter having emptied them, and the ore is maintaining its character, namely, chalcopyrite with a substantial percentage of bornite.

Nelson B. C.

The Gold Plate or Hummingbird Group of Mineral Claims, situated at the head of Roaring and Five Mile Creeks, are being opened up again, development work having been started recently by the owners. One of the men, in cleaning out the shaft, picked a gold ungget from white quartz. It was not large but the incident is considered a good omen and operations are to be continued until something more definite is known of the possibilities of this property.

Ainsworth B. C.

Shipments from the Cork-Province Mine have been suspended, the large carload of concentrates, having left the mine in August. The explanation given is that equipment is being awaited, the chief requirement being a cable for the tramway. Meanwhile considerable ore has been accumulating, there being several carloads of concentrates and a carload of ore on hand. It is estimated 500 tons of zinc concentrates are in the bunkers. Those interested in the Cork-Province have been much encouraged by the recent report of R. H. Stewart, consulting engineer, who recommends that $100,000 be invested in the development of its property in the Slocan District. Mr. Stewart proposed that a shaft should be sunk and equipped, that additional power be provided for hoisting, that drifting and raisen be undertaken on the new level, and that prospecteing and development be continued on the present working level. He also refers to possible additions to the Mill to provide for further fine grinding and handling of middling and tailing products.

The Lincoln Group, situated one and one half miles south of Blaylock, Ainsworth District, and which now is held under bond by J. H. Tompson and associates, is being developed to such advantage that the uncovering of a four foot vein of shipping ore is reported, the greater part being galena. It is said that the whole will average about 40 per cent lead with good silver values. This is an old property and the showing made as a result of the comparatively small amount of work done up to the present has created much interest throughout the district. One car of heavy ore was shipped last fall, the returns being satisfactory. This encouraged Mr. Thompson et al and operations were continued, still on a small scale. The hopes of the owners having been realized thus far, arrangements are being made to ship three cars of ore at an early date and a larger camp is projected for next Spring.

The Highland Concentrator, Woodbury Creek, Ainsworth, is in operation again after being idle for seven or eight months. It is handling ore from the stopes of the Highland Mine. While the latter has not been producing until recently, it has been under development constantly. This propert ybelongs to the onsolidated Mining & Smelting Co. of Canada. The Company has extended the area of its holdings by the acquirement of a number of claims adjacent to the Highland Mine, so that there is every prospect that this well-known silver-lead property will be a regular producer. An effort is being made by operators of other Ainsworth properties possessing milling ore to have the same treated at the Highland Concentrator.

Revelstoke B. C.

There are indications that the property and plant of the Multiplex Mining Milling & Power Co., Camborne Camp, are attracting the attention of possible investors of the Pacific Coast as well as of the adjacent Prairie Provinces. O. B. Bibb, who is associated with the Company, recently escorted a representative party of Vancouver citizens over the property.

It is confidently expected that important developments will take place shortly at Camborne. In this connection it is interesting to refer to the Gold Commissioners report of 1918 in reference to this property. He said:

"The Multiplex Mining Company, which has been the largest operator in the Camborne Camp during the past few years, ceased active work early in the year owing to conditions which made it impossible to get sufficient help from the economic working of the property. Up to date this Company has expended upwards of $25,000 in actual mine development, and the property now is in good position for future operations. It is understood that the finances of the Company are in good shape for this year and a vigorous development policy is planned. It is understood it is the Company's intention to construct a concentrator this year. It is likely to be a customs concentrator, and will be of great benefit to the small mine owner."

Merritt B. C.

The Chataway Mine, Highland Valley Mining & Development Co., is to be developed on a considerable scale. Title to the property has been secured and funds are available for an immediate resumption of operations. The mine and mill of this Company operated during 1917, producing over $100,000 net smelter returns. In January of last year the mine was closed for a number of reasons, chief among which was the necessity of meeting payments on the purchase of the Chataway Group. After meeting this funds were not immediately procurable to keep the development of the ore reserve ahead of extraction and development fell behind. Another reason given is that as ore would have to be mined below the adit level further plant was required. The year's experience also had clearly proved that to make satisfactory profits the tonnage mined and milled would have to be increased from about 35 tons daily to 100 tons at least. This, it is understood the directors now are in position to undertake and, as stated, work will proceed. The chief value of the ore lies in its copper and what is now exposed is about the best uncovered on the property. The vein maintains its full width and quality and the intention is to sink to depth on this ore body. The Snowstorm Group, on which the Provincial Government has been doing some diamond drilling, is situated in the vicinity of the Chataway.

Barkerville B. C.

Mr. R. A. Bryce, representing Toronto and New York capital, has secured an option on the Porcupine quartz holdings in the Barkerville district. The deal is the largest one comprising the Independence Group of three claims, owned by E. E. Armstrong, and the Imperial group of five claims owned by F. J. Tregillus, P. Carey and J. H. Blair. The price ranges into six figures and will mean much to the mining activity of this district.

The property contains gold-bearing quartz, there being apparently two large veins striking in a north-westerly direction as well as smaller ones. Mr. Armstrong first discovered these veins by an ingenious method of pan prospecting, making a systematic search by panning from the creek beds up the mountain sides. Once above the ledges the pan prospects disappeared, indicating he had reached a point above the veins. In this way the original discovery was made.

Using this method Messrs. Carey, Blair and Tregillus located a number of claims on the strike and after several seasons of prospecting and crosscutting picked these veins up, approximately 4000 ft. north-westerly, also a number of other veins.

A force of men will be employed immediately to develop the claim.

Victoria B. C.

Labor troubles have closed down operations on three of the most important of British Columbia's metalliferous mines. Two of these are situated in East Kootenay, namely, the Sullivan Mine, owned by the Consolidated Mining & Smelting Co. of Canada and the largest silver-lead-zinc mine in the world, and the North Star Mine, Kimberley, which has been shipping regularly to the Trail Smelter. The third is the Nickle Plate Mine, owned and operated by the Hedley Gold Mining Co. Ltd.

The Hedley Mine has been the greatest producer of gold in British Columbia for years, which position it held until the Surf Inlet Mines began operating on a considerable scale two years ago. The production has averaged around $700,000 a year. The ore is arsenopyrite and the Tacoma Smelter, which has been treating the concentrates, has been paying as well for the ascenic content during the past two years. Ore valued at between $4,000,000 and $5,000,000 is in reserve. With the fall in the purchasing of gold and the increased cost of production of late the Company's profits have been seriously affected. On top of this came a demand for an increase of wages from the miners and fifty cents a day was granted. A like amount again has been demanded and the directors have decided that, as this would mean operating at a loss, to close the mine and mill. As a result a force of about 100 miners will be thrown out of employment, a small force only being retained on development.

The Sullivan Mine is the chief source of zinc for the Trail Smeltery, the production of which is between 18,000 and 20,000 tons of zinc per annum. It is observed that the strike of the miners and the consequent practical closing down of the mine is likely to interfere with the Company's taking advantage of its agreement with the Dominion Government, which is a part of the war supply contract and under the term of which the smelter received a minimum price of 8 cents per pound for its zinc.

At a mass meeting of the miners of Kimberley matters relating to the strike were discussed. Negotiations looking to an adjustment have been conducted through a representative of the Department of Labor, Ottawa, a proposal being made to the men that, if the One Big Union was repudiated, the companies would be prepared to meet a committee of the employees. The appointment of a Board of Conciliation under the Industrial Disputes Act was the method suggested as being most likely to effect a settlement. However, while the Miner's Committee claimed it did not represent the O. B. U., the miners in attendance declined to give an undertaking that they would repudiate the One Big Union. Consequently negotiations ceased. The Government representative has returned to Calgary and the companies are said to be preparing for a long strike.

Alice Arm B. C.

With the Dolly Varden Mine and Railway in operation, and regular shipments being made from the latter property, together with gratifying reports as to the development of other properties, the season is drawing to a close in the Alice Arm Section of Northern British Columbia in a manner that argues well for the future. The North Star Mine has procured horses with which high grade ore, taken out during the summer, will be packed to the railway. If transportation can be secured, and there is every reason to believe that it will be available, $30,000 is expected to be realized from these shipments. This property has been developed to a considerable extent, a tunnel having been driven which is reported to be all in ore having a substantial content of native and ruby silver. A vein has been opened on the Muskateer, owned by Mr. Meenach, of Seattle Wn., of which very favourable reports are received. Samples taken from the open cut are said to have given value of $200 gold and 135 ozs. silver. The Tiger and Last Chance Mines also are looking well. Messrs Price and Crawford, of New York, are reported to have acquired the former, the consideration being $125,000 while the latter also is said to be controlled now by New York people. The Homestake Prospect, owned by Seattle interests, is promising. It is stated that on a property adjoining the latter free gold has been found. At the United Metals Mine are two pack trains of twelve horses each engaged in transporting ore which is expected to average 200 ozs. silver, $13 gold and 45 per cent lead.

BOOK REVIEW.

The Iron Hunter, by Chase S. Osborn. MacMillan Company, New York. Cloth 5½" by 8", 316 pp., illus.

This is an unusual book, and after reading it one realises that its author must be an unusual man. The book is actually an autobiography, of the kind that might be expected from a man who made his way by personal endeavour from a penniless condition to Governor of Michigan and a candidate for President of the United States. Mr. Osborn, writes: "For forty "years now I have lived in the robust north, and in "Winter I have taken a run naked and rolled in the "snow every morning before breakfast, when in the "woods, say at four o'clock. In all that time I have "known of only one young man who would follow "my example, without being ridiculed into it or com-"pelled in some way." One can quite credit the statement.

The author claims to have visited virtually every accessible iron-ore deposit in the world, and his travels include a journey by reindeer sled across Lapland, in February, and trips to Madgascar, Africa, Burma, Ceylon, Cochin-China, Turkestan, and Persia, all connected with the hunt for iron-ore that Mr. Osborn conceived as his life work. An interesting reference to Madagascar contains an intimation that the author

is aware of the location there of a vast deposit of iron ore containing metallic iron of 64 per cent and nine-thousandths of one per cent of phosporous..

But the most interesting references to Canadian readers in this kaleidoscopic recital are in connection with the north shore of Lake Superior, and Mr. Osborn is unstinted in his praise of the open spaces and clean wildernesses of our Canadian Northland. "North of "us lies the vastest unexplored territory in the world. "I refer to the Dominion of Canada. It is rich, and "where it is untouched by man, it is clean. There "is not a drop of unwholesome water nor any poison-"ous insects nor reptiles between Lake Superior and "the aurora borealis." Mr. Osborn has the blood of the prospector in his veins, for he remarks: "I think "the greatest charm of prospecting is not the hope "of finding wealth, it is the life in the clean unhurt "out-of-doors." Describing the north shore of Lake Superior he writes: "Olivines and epidotes make "floors of verde antique, and pegmatite shows red as "blood above and also below the waters." His description of the berries and natural beauties of this region are reminiscent of the writings of another poet turned geologist who has described Northern Cape Breton in the Geological Survey Reports of 1873, the late Hugh Fletcher.

A pleasing, and not overdrawn reference is to the work done in connection with the geology of iron ores in the Lake Superior country. "Such distingush-"ed names as Douglas, Houghton, Brooks and Pum-"pelly, Charles Wright, Irving, Symthe, Lane, Win-"chell, Chamberlain, Seaman, Van Hise, Leith, Hotch-"kiss, Merriam, Allen, Coleman, Miller and others are "familiar to those who are interested. At a time when "most of these men could have turned their knowledge "into money they have been ethical to an extent "that is praiseworthy. I do not know of one of these "who took advantage of his chance to make a profit; "not a single quack among them." And so say we all.

A further statement regarding the administration of Canadian mining law is interesting, coming from a man who is above all a typical citizen of the United States.

"I had heard" writes Mr. Osborn, "that nothing "could be obtained from the Government departments "at Toronto without paying for it; that from top to "bottom there had to be bribery. I saw nothing of "the kind during years of experience, and I do not "believe a word of it. The fees of Hearst and McKay "were reasonable, and they told me they never thought "of paying any "grease" money or permitting graft."

Our author tells of a "starvation hike" to an "iron dam" on the Vermillion River, of camping in such primeval wilderness that a bull moose walked over him while asleep, and winds up his chapter by stating:

"Where I slept in the little open shed tent, and was "unawakened by the moose that nearby stepped on "me, there is now a flourishing mining town reached "by a branch of a transcontinental railway. They "did not develop there without much hard and en-"joyable work." This refers presumably to Moose Mountain.

An anecdote of "Dan Mann" tells amusingly how the Canadian railwayman was challenged to a duel by a Russian count in China, and exercised the privilege of the challelnged to choose the weapons by selecting double-bitted axes, to the use of which the Russian, our author suggests wisely, demurred and the duel was off.

The book contains a full technical description of the mining and roasting of siderite at the Magpie and Helen Mines, and makes the observation that in this instance an elaborate and relatively costly mining and roasting system enriches from 30 to 50 per cent, an ore never before used in America, and it is done profitably. Reference is made to the astonishingly cheap and plentiful occurrence of iron-ore in the United States, and its effect on the relative value of lean ores. Our author pertinently remarks: "What are regarded "in the United States as lean ores are esteemed of "great value in other iron-making countries." Reference is made to an experimental plant at Duluth where Hayden Stone & Company enrich magnetic ores containing thirty per cent of metal to 62½ per cent by electrical treatment, which method alone, the author suggests "will make it possible to utilize the millions upon millions of tons of lean magnetite that belts Lake Superior like a containing encasement."

Mr. Osborn's unusual cast of mind is evidenced in his suggestion that a new and permanent standard for money could be found on the basis of calories. Gold, Mr. Osborn, contends, is not really a norm of permanent value, and the calorie does supply the markets and finances of the world with such a norm. Such a solution of the problem of coinage value fluctuation would not occur to the ordinary person. Mr. Osborn is evidently not an ordinary person, and his book is extraordinary, but well worth reading.

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:-: EDITORIAL :-:

HERBERT HOOVER.

The engineering profession in the United States has conspired to do honor to Herbert Hoover. Canada also desires to be conjoined in appreciation of a man who has honored his calling, who has portrayed to the world the best and most lovable type of the citizens of the United States, and who is entitled to the admiration of brother engineers of any and all nationalities. As a successful mining engineer, as an author, and as a true friend of humanity, Herbert Hoover deserves all the honors that have been heaped upon him. The concluding words of the address of the Toastmaster at the dinner held in Mr. Hoover's welcome and honor, express a universal feeling.

"On behalf of this audience" said Mr. Saunders, "on behalf of all engineers, on behalf of a war-stricken people, who did not pray in vain 'give us this day our daily bread,' on behalf of all America, let me say to you in the words of John Milton, 'Servant of God, well done, well done!"

A REVIVAL OF TECHNICAL LITERATURE.

During the past five years the entire absorption of the energies of the British peoples in the defeat of the Teutonic League caused a dearth of technical literature and a great shrinkage in the number of papers read before British societies. A glance at the comparative bulk of the annual transactions of learned and technical societies will show the disparity between the fat tomes of pre-war days, and the lean volumes issued during the war period. This hiatus can unfortunately never be filled in, for many of those who showed promise in scientific and technical investigation form part of the awful toll exacted by war, and will never again move amongst us. It is said that on the opening day of the 1916 Somme battles no less than 170,000 British casualties were recorded, and the flower of the nation died in that and other battles which—although we did not then know it—broke the power of the German army, henceforward only to be prolonged by collapse of our allies in other fields.

While a certain amount of scientific progress has been occasioned by the necessities of warfare, who can say how many undiscovered men of genius, how many inventions, and how much of value to science was destroyed by the deaths of war? This chapter can never be written, but we do know that the best, the bravest, and in many instances the wisest of our young men perished untimely.

Acknowledgment of this irreparable loss has formed the theme of resolution and memorial at all our society meetings held since the war ended, and in looking forward to a revival of society transactions to an extent that will in some measure approach pre-war dimensions, we cannot forget that we shall never recover in the present generation of men, the labours and discoveries of those who have died in war.

We should however, expect very shortly to see the reading of a larger number of technical papers before British societies, and a resumption of that gift for individual observation and research which has enabled the British citizen to send home to the particular technical society to which he may be most particularly attached, accounts of technical progress in every quarter of the globe. This wide range of origin has always been a distinguishing feature of the transactions of societies within the Empire, whether they have their headquarters in South Africa, Canada, Britain, or elsewhere under the Flag.

One result of the war has been the description before our societies of war, adventure and shrewd commercial and technical observation combined, in the remotest and most primitive countries. Now our scattered armies are returned home, and men, after a period of unsettlement and re-action which varies according to the war experience and spiritual make-up of the individual, are settling down to the tasks of peace. Many men look upon the war period as so much time wasted, as a dirty business which had to be done; and which they have well performed, and they return to scientific occupations with renewed love. They will find in work the forgetfulness they desire of things that were unspeakable, and dear only to memory because of the comradship, of those who fought side by side with them, and went through the same hell together. From these men we may expect great things, and not the least of their contributions to our life in peace-time will be their contributions to society transactions, and their presence at our society meetings, as was their wont in the days before the War.

The tremendous and sustained bulk of scientific transactions in the United States is an evidence of the comparatively smaller drain which the war made upon the man-power of that nation, added to which was the selective nature of the drafting for war, which purposely retained at the desk and the laboratory those whose scientific attainments and promise indicated the most effective manner in which these men could serve their country. The tragic feature of the war as it affected the British peoples was that before conscription was adopted, by a natural selec-

tion of the most discriminating kind, the golden youth of the Empire were placed in the forefront of battle, and died there.

That the transactions of our technical societies were kept going at all was in large measure due to the fathers of the societies, who renewed their youth and played the game at home by contributing papers, feigning thereby a detachment from the obsession of the war, which they did not feel, for in too many cases their sons were gone from them.

In the years to come the bound volumes of society transactions, as they stand in the bookcases, will remain a mute reminder of the manner in which the British peoples entered into a righteous but unwelcome war, and for the space of about five years did little else but fight and prepare for more fighting.

THE BOOM IN PULP AND PAPER INCORPORATIONS.

"Pulp and Paper Magazine" writes editorially:

"The future of our industries, dependent upon the forest crop, lies in the realization that timber is a crop, and that provisions must be made for raising trees according to scientific methods. * * * Without an insistent and intelligent demand by the public for a proper administration of forest resources, we may expect one or two generations of prosperity, and a future of industrial pauperism so far as these industries are concerned."

In view of the tremendous activity of pulp and paper, and the extraordinary speculation now taking place on the Montreal Stock Exchange in pulp and paper securities, it is reassuring to know that such a prominent exponent of the industry as "Pulp and Paper" is courageous enough to speak a warning word.

Recently we were favoured by a call from an eloquent salesman of a pulp product, who enlarged enthusiastically upon the digestive capacity of his company's mills, on the enormous amount of timber they could chew up in a given time, but when asked what provision for reforestation was being made by his people, the salesman was significantly silent, and stated this matter did not concern his end of the business.

"Pulp and Paper" states that a number of the larger pulp companies are co-operating with provincial and federal authorities in the matter of reforestation, and it is to be hoped such co-operation is effective and will be extended to all places in Canada where the country is being stripped of timber. No one, we imagine, wishes to see Canada denuded of her timber and pulpwood to feed the insatiable maw of the printing presses of the United States, but there is the gravest danger that this will occur.

The coal-mining industry is very much interested in the preservation of timbered areas for the supply of pit-timber. The available supply of suitable pit-prop timber is annually decreasing in the coal-mining districts of Canada, and its cost is annually increasing. As the facts regarding this phase of the question may shortly be the subject of official report, we do not at this time enlarge further upon the interest which coal companies should manifest in the provision of a future supply of pit timber.

Timber is a crop, a crop that is annually drawn upon in countries where scientific forestry is employed, but if ruthless stripping is indulged in, and no reforestation takes place, the possibility of future crops is destroyed, because the natural conditions of soil and moisture which are necessary to tree growth are irretrievably obliterated by methods which look only to immediate dividends and care not for the morrow.

ACTIVITY IN NOVA SCOTIA COAL TRADE.

For the first time since 1912 there are indications that some chastened optimism may be indulged in regarding the immediate future of the coal trade in Nova Scotia.

All the collieries report steadier work, and look forward to a fairly busy winter. Some of the reasons for better production may be reviewed.

Regarding the St. Lawrence market, the release of a number of the Dominion Coal Company's ships has permitted a certain tonnage of coal to be sent to the customary destination of Nova Scotia coal, and we look forward to a steady regaining of this market by Cape Breton mines, although the process will be a gradual one. The "Empress of France" recently bunkered at Quebec. As the "Alsatian" this vessel bears a proud war record, and many thousands of tons of Cape Breton coal did she burn in her frequent trips to Halifax. It was a strange commentary on the results of the war to see her being bunkered so far down the St. Lawrence as Quebec, with United States coal, under the supervision of officers all of whom bore some decoration or other reminder of their war services.

The European demand has helped the Nova Scotian mines, and the supplying of this market is hindered only by two factors, the availability of shipping and the matter of international exchange.

The resumption of production at the steel works, necessitating something approaching normal coke manufacture is probably the most important single factor in stimulating production. It was notable that during the recent short suspension of steel manufacture, the question of the disposal of slack coal assumed importance, and acted as a reminder that the genesis of the manufacture of steel in Cape Breton was a consequence of the necessity to dispose of the surplus slack coal associated with increased export shipments of coal.

The reflex of the demands of the bituminous coal-miners in the United States will have an important effect on the demand for Nova Scotian coal in Cana-

dian markets. Should a strike take place at November 1st, as seems now very probable, there will be grave interference with shipments of bituminous coal to Canada, but as the threatened strike is timed for first November, Nova Scotian collieries can not help very much, as River navigation will be closed, and the sending of coal to Montreal by rail is not a very feasible expedient.

The fact that demand is improving does not mean that great prosperity is about to visit Nova Scotia. The production for 1919, notwithstanding the probability that the collieries will work to capacity during the remainder of the year, will still be the lowest in a decade, and it is only by virtue of lessened coal production elsewhere that a sharper demand for Nova Scotian coal is now being experienced. The inefficiency of the working organization which resulted from the war, and the greatly increased cost of production which it, and the increased cost of materials has occasioned, are still in evidence. When trade conditions become settled elsewhere, Nova Scotia coal must compete with other producing centres, and the present temporary revival of demand does not justify the granting of still higher wages and still shorter hours which it is hinted the mineworkers are about to ask.

The "Journal" offers its congratulations to Prof. F. H. Sexton, the Director of Technical Education in Nova Scotia, and head of the Nova Scotia Technical College, on the honorary degree of D. Sc. from Acadia University, and LL.D. from Dalhousie University at its centenary convocation. These degrees were given in recognition of his work in technical education in Nova Scotia and in the vocational rehabilitation of disabled soldiers. We congratulate also the Mining Society of Nova Scotia and the Canadian Mining Institute on the honour conferred upon a member.

This recognition of Prof. Sexton is well deserved. He has carried the work of helping lame dogs over stiles to a praiseworthy degree, and because of the personal enthusiasm, clarid but optimistic vision, and the unremitting toil which he—and Mrs. Sexton also—have put into this self-imposed task of practical humanitarism, few men in Canada have deserved better of this country.

The work commenced by Prof. Sexton in Canada early in the war has been a pattern on which similar work in the United States and in Britain has been modelled.

Some optimists are unreasoning and unpractical, but Prof. Sexton, in a superlative degree, combines optimism with a practical genius for getting useful work done.

Prof. Sexton's work in technical education in Nova Scotia has been very successful, considering the entirely inadequate monetary appropriation available for secondary education in the Province.

An intimation has appeared in Canadian newspapers that the well-known emblem of the Prince of Wales' feathers with the motto "Ich dien" is taboo. We are glad to notice that whoever is in charge of the decorations of the C. P. R., Windsor St. Station in Montreal has had the good sense to ignore this gratuitous advice. One might well object to the Latin mottoes on regimental crests because Nero was a Roman. The incident which gave rise to the adoption of the words "Ich dien" occurred, "as every schoolboy knows" in 1346, and the connection with the events of 1914 is not strikingly apparent.

The spirit of those who would erase all teutonic language and symbols from English is the spirit of the Pharaoh who erased the cartouches of his royal predecessors from obelisk and pyramid, or of that Chinese autocrat of low origin who ordered that all literature should be destroyed because he suspected the literati were laughing at his rustic manners—as they probably were. Those who fought the Germans and destroyed their military lunacies would be the last to advocate such infantile action. One of the most nauseating things of the war period was the jejune inscriptions that were placed under war photographs in the half-penny illustrated papers published in England. Their untruthfulness roused the incredulity of the kindergarten. By the way, why not delete this word from our language?

At the recent convocation of Queen's University, the honorary degree of LL.D. was conferred upon Mr. G. H. Duggan, President of the Dominion Bridge Company, and Chief Engineer of the St. Lawrence Bridge Company, during the building of the Quebec Bridge. Mr. Duggan is a past-President of the Canadian Mining Institute and of the Canadian Society of Civil Engineers, and congratulation has already been extended to Mr. Duggan by the Montreal Branch of the Engineering Institute of Canada, and will doubtless be forthcoming from the Canadian Mining Institute. The Faculty of Queen's is also to be congratulated on having observed, what has apparently been overlooked by more august but less discerning bodies, that the erection of the Quebec Bridge was an outstanding and notable achievment in Canadian engineering annals, and of much greater value than many breweries and many newspapers.

BOOK REVIEW.

MILL AND CYANIDE HANDBOOK, comprising Tables, Formulae, Flow-sheets, and Report Forms, for the use of Metallurgists, Mill-men, and cyanide operators. A. W. Allen, London. Charles Griffin & Company. 4 by 6¾ in. 6s. Od. net.

This addition to Messrs. Griffiin's well-known series of technical handbooks is a practical compilation in handy form of the data required by those in charge of milling and cyaniding operations. A glossary and an index are added. A large part of the book is occupied by typical flow charts and by report forms.

A Lightning Visit to a Scottish Coal Mine

By A. W. SWAN.

The writer was recently able to visit one of the largest Scottish coal-mines while on a visit to the Old Country armed with an introduction from the Canadian Mining Journal to Mr. Kirkby, manager of the Wellesley mine of the Wemyss Coal Company. Mr. Kirkby was away at the time the letter was forwarded, but referred the writer to Mr. Brown, the colliery manager, and thanks are due to both gentlemen.

The Fifeshire coal-mines of Scotland are comparatively speaking, a new field, and have scarcely reached their full development. One of the largest companies operating the mines is the Wemyss Coal Company which works the rich mines on the property of the Earl of Wemyss on the Fifeshire coast of the Firth of Forth, the boundaries of the property being roughly from Dysart (Kirkcaldy) to Methil, the great coal-port, a distance of seven miles, and a couple of miles inland. The largest of the Wemyss mines is the "Wellesley pit, ' and it was to this pit that the writer was directed. A number of villages lie between Dysart and Methil, and as the train service is rather indirect from Edinburgh the writer took his trusty bicycle and followed the familiar road from Burntisland through the "Lang Toun" of Kirkcaldy. By the way, a native of Kirkcaldy in Montreal would have a touch of homesickness as he passed along Notre Dame towards Maisonneuve by the linoleum factory—Kirkcaldy manufactures a large proportion of the world's linoleum, and the factories have a smell that is almost as distinctive as that of a pulp-mill.

"Are you the American that was to see over the pit?" Thus Mr. Brown at the Wellesley pit office—on the discovery that the writer belonged to Edinburgh, had spent several summers on the Fifeshire coast, etc., relations became more cordial. "Tell the other girl to give the gentleman's bicycle a wee bit clean."

The Wellesley pit is not only one of the largest mines in Scotland, it is also extremely well equipped. The output of the mine is increasing, and the coal measures are not fully developed. As the present output is in the neighbourhood of 5,000 tons per day, it can be seen that this is no small mine.

In order to handle the double-deck cages with the maximum of dispatch, pithead and pitbottom are being equipped with two landings so that hutches can be unloaded and loaded for both decks simultaneously. At the pithead the hutches (half-ton) are distributed to the various tipplers where their contents are discharged on to slowly moving belt conveyors. On these conveyors the coal is hand-picked, all the smaller coal going to the large washing plant. This work (picking) is done largely by women. The narrow gauge hutch tracks from the tipplers meet, and the hutches are brought back to the "empty" side of the pithead by a chain creeper haulage. With this arrangement the hutches pass around the pithead without needing any physical work on the part of the workers beyond setting the switches, etc. At the pit-bottom the arrangement is somewhat similar, that is, there is a gravity distribution of the empty hutches around from the shaft to the various main galleries which are generally equipped with cable haulage. As the general slope of the main galleries is down towards the pit bottom, power is used only in hauling the trains of empty hutches to the working face. With this extensive use of cable haulage there are few ponies used in the mine; at the time of the writers visit there were only thirteen in the Wellesley pit.

The engine equipment at the pithead is remarkably complete. Exhaust from the winding engine goes to a turbo-generator, and from this to the condenser. Superheated steam is used at 150 lbs. pressure, the equipment also includes economiser and spray cooling pond for the condensers. With such a complete equipment it is not surprising that power is generated at a remarkably low cost, the estimated cost of electric power being ½ cent per K.W.H., which is somewhat remarkable at the present high pithead cost of coal.

The winding engine is of 4,000 H.P. constructed by a Kirkcaldy firm of engineers, cylinders 38 in. diameter (non-compound), and powerful enough to handle considerably in excess of the present maximum load. The present depth of working is 1500 ft., the time for the hoist being 50 seconds. The winding engine has the usual control of throttle, reversing gear and brake, the latter being compensated. A simple over-winding gear trips throttle and brake should the engineer fail to slow within a certain distance of the pithead. In addition tc the Parsons exhaust steam turbo-generator there is a Curtis turbo-generator and also three Belliss and Morcom 500 H.P. generating sets, one of which has been in operation for fifteen years. The current is generated at 6,600 volts three phase alternating, and is stepped down in the pitbottom sub-station, the main use for the power below-ground being for pumps and the numerous haulages.

The descent in the cage to pit-bottom was remarkably smooth, quite as smooth as in any of the modern elevators in New York. Around the pit-bottom the main galleries are electrically lighted, but this system does not extend far from pit-bottom. The mine, like most of the East of Scotland mines, is free from gas, and the miners use little oil lamps which they usually wear in their caps. Near the pit-bottom is a large pump house containing a large steam plunger pump—supplied from the pithead boilers, and two electrically driven Sulzer centrifugal pumps of 500 G.P.M. capacity. At this point the writer was introduced to one of the "oversmen" or foremen who was to be guide at one of the working faces.

The Wellesley pit is for the most part under the Firth of Forth, the shaft being practically on the foreshore. As far as is known at present the Fife coal seams pass right under the Firth of Forth, re-appearing in the Haddingtonshire coal-mines on the south shore of the Firth. At present the workings reach out a considerable distance, but the problem is somewhat that of the Nova Scotia coal mines, in that the further the seam is followed the deeper the mine goes, with a corresponding increase in difficulty of winning the coal. However, the Wellesley pit is only in its early stages, and judging from the cross-section in the main office, there will be no lack of coal from this particular mine for a long time to come. As a rule the coal-seams in British mines are thin, but a number of the seams in the Wellesley run up to 4 ft., and sometimes more, so that they are frequently worked in two layers.

From pit-bottom to the working face of the Chemiss seam which the writer visited is a mile walk along one of the main galleries having one of the haulages. This seam is being worked on the retreating longwall system. Mr. Brown, the manager, has introduced "hydraulic scouring," which he finds very useful in reclaiming coal from the "red" or waste, and also very useful in case of any section taking fire. Although the mine is free from gas, fires will occur occasionally due to settlement, and in such an event the only remedy is to isolate the section.

Compressed air is not used to any great extent either in this or other Scottish coal-mines, there being only one small compressor near the pit-bottom to supply air to the hammer-drills used in tunnelling in the rock. The longwall system of coal-working is suitable to the chain and disc type of coal-cutters, and the Wemyss Coal Company has been experimenting with both, although the experiments have not yet reached the final stage, and the great bulk of the coal is mined by ordinary pick and shovel. However, as in many other industries in Great Britain it is not entirely fair to blame the management; the use or non-use of labor-saving machinery depending very largely on the attitude of the labor union heads. The Wemyss Company has just completed a twelve months' test of a chain coal-cutter, but has not found it satisfactory, and is now trying a disc machine manufactured in Scotland, so far with success. The writer did not have time to make a detailed examination of this machine, and the only light available was a smoky little oil lamp, but roughly speaking the disc machine is similar to the same type as manufactured in America, the body of the machine resembling a small mine locomotive, and the disc with its picks set in the periphery, projecting from the body. The feed is by a cam and ratchet arrangement, the amount of feed being varied by controlling the number of teeth caught at each move forward. The feed is also controlled by a clutch which is automatically thrown should the picks suddenly strike hard spots in the coal.

The working face "oversman," Mr. Briggs, took the writer for a quarter of a mile scramble through the working face.

The return to pit-bottom was made at one o'clock, "knocking-off time," and to get into the cage it was necessary to get a brass check from the office near the shaft, and wait for that number to be called out as only 16 men are allowed on each deck of the cage.

COAL NEWS FROM ALBERTA.

Coal Commission Sits in Edmonton.

Some interesting evidence was given recently at Edmonton, Alberta, before the Coal Commission, appointed to investigate conditions with reference to the available supply of this fuel, cost of production, etc. G. G. Sheldon, of the Humberstone Coal Co.; W. S. Cupples, of the Great West Coal Co.; H. C. Anderson, of the Twin City Coal Co.; L. E. Drummond, of the Mountain Park Coal Co.; and W. C. MacKay, of the MacKay Coal Co., were among those heard. All the operators were agreed that there was a great overdevelopment of the mines in the district; the fact that they only work five or six months in the year was a big factor in the cost, for the upkeep during the remainder of the year had to be borne by the coal produced during the short producing period of the year. They also agreed that there would be much benefit in the marketing of coal by the standardization of screens, and this was especially true when catering to a competitive market such as that of the Province of Manitoba. The quality of coal being shipped into Manitoba should be very carefully controlled. The operators felt that there was as much reason for the standardization of grades in coal as with wheat, butter, or other products made for export or even for home production, as the satisfaction of the consumer was so much greater. Another suggestion was the appointment of a Commission to regulate and control the opening and operation of coal mines in the Province of Alberta. There should be some man, it was argued, with authority along the lines of the Railway Commission. To this Commission one proposing to open a coal mine would have to show that he was financially able, not only to open the mine, but to sustain operation of the same for such period as might be considered necessary to get it on its feet. The standardization of export coal also would be a matter for the attention of this Commission. Evidence also was taken with reference to housing accommodation at coal mines.

GOVERNMENT RESERVE COAL AREAS IN SMOKY RIVER DISTRICT, NORTHERN ALBERTA.

With a view to creating a coal reservation in Northern Alberta, coal mining rights have been withdrawn in regard to a district near the junction of the Muskeg and Smoky Rivers. The order-in-council withdrawing mining rights states that a very large and valuable deposit of high grade coal on Dominion lands has been reported in the district, seventy miles from railway communication.

NOVA SCOTIA NOTES.

Nova Scotia Steel Co.

The officials of the Scotia Company anticipate that 1919 outputs will exceed those of 1918. The production of the collieries in 1918 was 502,018 tons, and indications now are that a total of 550,000 tons for the year may be reached for 1919. In this event, 1919 will show the highest production since 1914.

Dominion Coal Company.

It is announced that the Dominion Coal Company is proceeding further with the electrification of its collieries, a policy which was adopted about 1905. The application of the exhaust-steam turbine to electrical generation at the individual collieries is finding a wide application, installations of this kind being already in place at No. 2 Colliery, No. 1 Colliery, and in contemplation at No. 6 Colliery. The experience with an exhaust-steam turbine has been particularly good at No. 2 Colliery, where a Daniel Adamson turbine, driving a Brown-Boveri generator was installed about 1910 and has run steadily and satisfactorily ever since. The Dominion Company's experience with electric drive has been encouraging, and it includes application to underground pumping, colliery screening plants, ventilating fans, direct and auxiliary underground haulages, and hoisting engines for slope haulages. The greatest development of electrical power lies in the future in the winning of the undersea coal seams. The possibilities of the application of electric power to this problem are wide, and fascinating, and in Nova Scotia it will always be necessary to remember, in framing regulations for the governance of the use of electricity underground, that electricity, in the light of present knowledge, is the only motive power that will enable these vast submarine coal deposits to be won.

MANITOBA NOTES.

Mr. J. B. Tyrell has been retained to make an examination of the Gabrielle Mine in the Manigotagon. He will also report on the Gold Pan property.

A very general revival of interest in mining is reported in Manitoba, and Messrs. Milton Hersey & Co., through their Winnipeg office, report a great increase in the number of mineral samples submitted for examination.

The "Free Press" of Winnipeg states that the Beaver Lake, Saskatchewan, an older camp than either Flinflon or Mandy, is again coming to the fore. Messrs. G. A. Pow, Alexander Boyd and J. C. Collette have returned from a visit to a group of claims which Mr. Pow has held since 1915. The veins are enormous, but extremely low in grade, so that gold mining, though it may eventually be successful, will only be so if conducted on a large scale.

But Mr. Pow is showing some more interesting graphitic schist, samples of which, according to an analysis by Milton Hersey, run 8.17 per cent carbon and 0.28 per cent iron. This is a huge deposit. Where the body was trenched it measured 195 feet from wall to wall. Samples are being sent to Dixon and Co., of Newark, N.J., as well as to the Department of Mines, Ottawa to be reported upon.

DEVELOPMENT IN RICE LAKE GOLD AREA, NORTHERN MANITOBA.

Recent developments in the Rice Lake gold fields are being followed in a great deal of interest by those who claim that Manitoba has not yet awakened to her possibilities as a province very rich in gold deposits.

It is not generally known, but it is stated as a fact, that engineers representing an enormous amount of outside capital will, this winter, undertake very searching enquiries into the Rice Lake district. In the vicinity of Big Rice Lake it has been known ever since the Gabrielle was located that deposits of silver and copper exist as well as gold. This fact was known by the Gabrielle people back in 1912, and they hope to bring back to light several features by next summer which will amply prove the fact that Manitoba has not yet realized what her real wealth in mineral deposits is going to be.

As many already know the Gabrielle properties have been very exhaustively explored as far as the initial stage and they are now well advanced to the stage where further development is warranted on a much larger scale, and with more improved machinery. It is understood that their future plans of development work will be under the direct supervision of the best quartz mining engineer obtainable, and this decision seems to be quite warranted after Mr. Tyrell's remarks concerning the nature of rock existing in some of the world's richest quartz mines and which the Gabrielle people claim exists on their properties as well as one or two other claims which have been prospected to any considerable depth.

To the Gabrielle mine, which is the pioneer prospect of the Rice Lake district, the province may yet owe a great deal for the tenacious way they have stuck to their convictions that not only they, but several others, have what may yet prove to be very wealthy properties and which may eventually mean a great deal, not only to Winnipeg, but the West generally. They do not lay claim to being the only prospect worthy of support by the people of Manitoba and the West, but they apparently quite firmly believe in a conservative and sound management with the eventual result that their original views on our wealth in the Rice Lake country and elsewhere will be amply confirmed, and that sanely conducted mining ventures will finally prove of enormous value to those whom it should —the shareholders.

LEFT OUT IN THE COLD; POOR LITTLE CINDERELLA!

Manitoba is the Cinderella of the Canadian sisterhood, so far as the Geological Survey is concerned. The survey seems to have a fixed idea that British Columbia is the land of promise, and to that favored province go geologists in gangs, while we get but a stray one. Of course, B.C. is attractive; the climate is in most parts delightful, the scenery grand in the extreme; possibly science there finds its surroundings more conducive to the correct attitude of mind for the unravelling of complicated stratigraphical problems. No doubt, no doubt. Yet poor old Manitoba is trying to tell the world that as regards mineral wealth she can do her bit, and more than her bit, is given a chance, and we should be so thankful if the powers that be would send us a nice big flock of experts next season. Please do!

In Ontario the Dominion and provincial authorities seem to take delight in duplicating one another's work. P. C. Hopkins examines Larder Lake for the Ontario Bureau of Mines; shortly after, Dr. H. C. Cooke hastens there to read its riddles for the Dominion survey. A. G. Burrows reports on the Matachewan area, for Toronto, and forthwith Ottawa sends Dr. Cook to investigate what is in the same map sheet. To those that have much shall be given.

As for B.C. she is the petted darling of the G.S., if not its first love, certainly its latest. Eight parties have been assigned to the province during the summer, and a ninth took over the Mayo country, Y.T. J. J. O'Neill has been in charge of the party studying Salmon Arm, Portland Canal; B. R. McKay has investigated the placers of Cariboo; L. Reinecke passed weeks estimating the value of the soda lake between Clinton and Quesnel; the Slocan attracted M. F. Bancroft; the wild west coast of Vancouver Island yielded a wealth of information to V. Dolmage; S. J. Schofield seems to have discovered a new mining property which the Review calls "Brittania," S. C. McCann accumulated material for a map of the Bridge River country; and, lastly, Charles Camsell, the O.C. of the brigade, paid particular attention to the Coquilla section.

What are our members at Ottawa doing? Are they asleep? We have known men who would have got up on their hind legs and roared long ago.—C.A.B., in the Manitoba Free Press.

MANITOBA PERSONALS.

Gordon McTavish has gone up to the Gold Pan with J. B. Tyrell, M.E. The property will be thoroughly sampled.

G. A. Pow of the Copper King group, has returned from a journey to Beaver Lake, Saskatchewan, where he is interested in the Little Nell and other gold quartz claims.

Major Wheeler, of the city, is back from a trip through western end of The Pas district and the extreme easterly part of that of Prince Albert. He is said to be astonished at what he saw.

Special Correspondence

BRITISH COLUMBIA.

Grand Forks B. C.

Silver-lead ore of good quality has been found on a number of properties situated on Lightning Peak and, as a result operators and prospectors are showing some concern over the solution of the transportation problem. This peak is at the watershed of Cherry and Fire Valley Creeks and the north fork of the Kettle River. Hitherto the Fire Valley route has been regarded as affording the best transportation. Now, however, it is advocated that the camp should be opened by way of the Kettle River and Franklin Camp, it being contended that the grade will be better although the distance is greater than it is via Fire Valley.

Slocan B. C.

The Silversmith Mine, formerly known as the Slocan Star, a property over which there has been considerable costly litigation, was the subject of a recent deal of some importance. J. M. Harris, of Sandon, gave an option to B. Cohen, of Spokane, on 250,000 shares of common stock for $60,000, retaining his preferred stock. This is 20 cents a share and would make the total valuation of the Silversmith about a million dollars. It is suggested that John White, of Spokane, is behind the purchase and that the stock will be listed in New York.

Rossland B. C.

There now is no doubt that the Consolidated Mining & Smelting Co. of Canada will build a concentrator at Rossland B. C., having a capacity of 1500 tons a day and costing in the neighborhood of $750,000, for the purpose of treating the milling ores of the Company's Rossland properties. Mr. S. G. Blaylock, general manager, conferred with the municipal authority of Rossland recently in regard to the obtaining of a water supply and it was arranged that the necessary steps would be taken immediately to compile data as to the cost of such alterations to the waterworks system as will permit the impounding at the present reservoir of 78,000,000 gallons of water. This means the construction of a dam and a flume and the Company has offered the city the use of its engineering staff to faciliate the preparations of this data. Mr. Blaylock has given his assurance that, in the event of the city having to issue debentures to take care of the expenditure, the company will expect to assist. He however, has made it clear that the company's plant shall not be subject to ordinary city taxation.

Trail B. C.

Not only is the Consolidated Mining & Smelting Co. extending the scope of its operations at Rossland B. C. but, if reports as yet unofficial are to be credited, it promises the installation of a concentrator of large capacity at Kimberley B. C., to treat the ores of the Sullivan Mines, and is considering a similar plant, of smaller size of course, at the Sunloch Copper Mine, situated on the West Coast of Vancouver Island. The latter would have a capacity of about 500 tons. In this connection it is interesting to note that the new mill of the Canada Copper Co., Allenby B. C., is expected to be ready to commence operations early in the new year, the plan being that its concentrates shall be shipped for smelting to the Trail Smelter of the Consolidated Company.

The Consolidated M. & S. Company has abandoned the Fitzsimmons Group at Alta Lake on the Pacific Great Eastern Ry. on which it took a bond for $200,000 in the fall of 1918, established a camp, and started work which was suspended for the winter. There was a question of reducing the purchase price this Spring. No arrangement could be reached satisfactory to both parties and the Company has withdrawn. The owners now are in negotiation with other operators.

Ore receipts in gross tons for the week from September 22nd to Sept. 30th, inclusive, at the Consolidated Mining and Smelting Company's smelter, Trail, were 5,199, making the total for the year up to the date indicated 258,323 tons. Again the Mandy Mine, Le Pas, Manitoba, was the largest independent contributor shipping 558 tons. The Quilp, Republic Wn., sent 487 tons; the Lone Pine, Republic, 104 tons; the Blue Bell, Riondel B. C., 156 tons; the Josie, Rossland, 116 tons; and the North Star, Kimberley, 98 tons. Of the Company's properties the Centre Star, Rossland, shipped 1884 tons and the Sullivan, Kimberley contributed 1377 tons of zinc ore.

An interesting circular was issued recently by the Consolidated Company to the lead ore shippers to the Trail Smelter. It reads as follows:

"There has been a desire expressed by some of our shippers for a settlement for lead on a more definite date than is possible with a continuance of the present pooling scheme.

"Stocks are still considerable but are more nearly approaching normal and now that we are no longer supplying munition orders the demand can be depended upon to be more uniform than in the past.

"We are still suffering severe competition from Mexican lead and have to meet such priees as are made by those selling this lead. The so-called Montreal price is merely the St. Louis price plus freight and duty. There is practically no lead saleable in Canada at this price under present conditions In addition to the Mexican competition for Canadian domestic business, considerable quantities have had to be exported at the open market price to reduce stocks and take care of current production. This was due to the light Canadian demand. In spite of these adverse features we have been ble to average in each month's sales considerably more than the New York price for lead. We are therefore changing our method of lead settlement commencing with shipments received here on October 1st, and are amending Schedule "C" as follows.

" ' All the provisions on page 2 respecting payments for lead are cancelled and the following substituted:

" ' Lead—The lead contents will be determined by the wet method of analysis, deducting one and one half units to arrive at the dry assay. Lead will be accounted for on the dry load assay to the extent shown by the above assay; provivded, however, that in no case will the deduction from the said dry lead assay be less than one unit. or twenty pound per dry ton of ore.

" ' The price for lead to be used in settlement will be our average sales price delivered at destinaion in Canada, for the second calendar month succeeding the date of sampling, or the A. S. & R. Co's New York average quotation for the said second calendar month, which-ever is the greater, less a deduction in either case of one and one-half cents per pound for refining and marketing.

" ' There will be deducted also from the settlement price. $2.30 per ton on sales at Toronto and common points, and $4.50 a ton on sales at Montreal and common points, and similar diffferentials to other points. This freight adjustment is to cover actual increases in freights; e.g., should sales in any month be 2,000 tons, and say 1200 tons for delivery at Toronto and 800 tons at Montreal, the freight adjustment would be three-fifths at $1.30 and two-fifths at $4.50, or $3.18 per tons of lead."

Paragraphs A, B, and C, on Page 4 under the heading "Settlement" are cancelled and the following substituted:

Settlement a,—Shortly after sampling, an advance payment of 90 per cent of the apparent value will be made. The prices used in estimating the apparent value will be the New York price for lead.

Settlement b,—Shortly after the close of the second calendar month after sampling. when the data is available. the final value wil be computed and any adjustment necessary will be made between the Smelter and the mine."

"You will note that the least you can get is the price the United States smelters decide upon, and we will use every effort to make it as much more as we can. This is, of course, in our interest as much as in yours, as we are producing the bulk of the lead.

" Settlements for monthly receipts prior to October will proceed under the pooling scheme until further liquidated."

Kimberley B. C.

No sign of a settlement of the strike of the metalliferous miners, employed in the Sullivan and North Star Mines, was apparent on Saturday, October 11th, last. The men are out for an increase of $1 per diem in their wages and the management of the Consolidated Mining & Smelting Co., the Company chiefly concerned, has refused to negotiate the issue until the men repudiate the One Big Union. The committee representing the strikers has said that the men are out as a body of employees having no affiliations with any estblished miners' organization. This, however, they were unable to put in writing and judging by the attitude of Mr. S. G. Blaylock, the Company's manager, the latter is preparing for a long drawn out fight.

The contention that the O. B. U. is behind the walkout appears to be confirmed by a report published in the "Federationalist", a labor paper published in Vancouver, of a convention of District No. 1, metalliferous miners of the O. B. U. held at Nelson on September 21 and 22. Here it is stated that the chairman. T. B. Roberts, despite the fight for jurisdiction put up by the International Union of Mill, Mine and Smelter Workers, the O. B. U. had made esplendid progress, all the local unions, with the exception of that of the City of Sandon, being in the fold.

The statement continues:

"The camps at Trail and Rossland hal been granted 50c. per day increase owing to activity of the O. B. U. Kimberley unit had put in a demand for $1 per day increase, and having been turned down, had struck. This action was deplored by the executive committee who wanted the local units to live up to the demands of the general constitution. In this respect the demands should have been presented to the district executive board, and the chairman stated that if the units persisted in taking hasty action. the ultimate result would be the crippling of the organization.

"The executive recommended an active campaign against unsanitary camp conditions, and the Convention concurred in the report and recommended that pressure be brought to bear on all candidates seeking election to Provincial and Federal parliaments to have this remedied.

"The Convention decided to put a referendum of the membership in the employ of the Consolidated Mining & Smelting Co. the question of demanding $1 per day increase or a strike to enforce the demand."

The West Kootenay Power and Light Company will build a high power line from Bonnington, near Nelson B. C., to Kimberley, a distance of 100 miles. It will also built a line to the Rock Candy Mine of the Consolidated Company.

Riondel B. C.

A new strike of silver-lead-zinc ore has been made close to the old Blue Bell, Riondel. The vein is of fissure variety, cutting across the country formation of bedded schists and granite intrusions and has been traced for three-quarters of a mile. The ground has been staked and re-staked in the past because of its proximity to the oldest metalliferous mine in the Province but has never before been developed to any extent. It is the intention of the discoverers, R. D. Hearn and D. L. Eastman, to continue their open cut for a short distance, which has gone through eight feet of ore and still is in it, after which work will be continued on a tunnel nearby with the aid of a gasoline power drilling outfit.

Nelson B. C.

Exceedingly favorable reports have been received concerning the Iva Fern Property, situated on Cultus Creek, which is being developed by the Consolidated Mining & Smelting Co. It is stated that No. 2 Vein is known to extend over five miles, that it is more than 50 feet wide in places, and carries good percentages of gold, silver, lead and copper. J. Riley, a well-known prospector who is working a group of claims across the Creek from the Iva-Fern, states that all the development on the chief veins of the latter has been by open cuts and that there are large showings of good ore. J. W. Mulholland, the manager, is now driving a crosscut, designed to give a depth of some two hundred feet on No. 2 Vein, as well as to cut all the leading veins. Up to the present there are no facilities for the shipment of ore outside of a pack trail.

His Royal Highness, the Prince of Wales, in the course of his recent tour of British Columbia, made short stays at Nelson and other mining centres of the interior. For his benefit Fred A. Starkey, commissioner for the Associated Boards of Trade of Eastern B. C., E. W. Widowson, J. J. Currie, and other mining men and members of the Board of Trade, had placed on board the boat which took the Prince from Nelson to Balfour, (a soldiers' convalescent home on Kooteney Lake) a collection of specimens of the ores of the Kootenay—Boundary Districts. H. R. H. was much interested and listened with close attention to those who expounded the mineral resources of the Eastern sections of the Province, pointing their observations with the samples shown. Among the properties represented were: Standard Silver Lead, Index, McPhail's copper, Nickel Plate, Perrier, Bayonne, Kootenay, Gold, Gold Plate, Columbia Copper Gold, Sirdar, Lockhart, Le Roi, Bond Holder, Freddie Lee, Carpenter King, Meteor, Lightning Peak, Silver Cliff, Kootenay Belle, California, Black Prince, Hudson's Bay.

Some curiosity is shown with mining men with reference to some strips of crystallized nickel-sulphate, which were a part of the exhibit of ores and smelter products of the Consolidated Mining & Smelting Co. shown at the recent Vancouver B. C. Exhibition. One of these has been presented to a Nelson mining man. The crystals, of a greenish cast, are formed upon a lead strip which was hung in the solution from which they were deposited. Although the Company has not yet disposed of any of this nickel commercially it has accumulated a considerable quantity of it and it is stated that this by-product is being formed all the time. This is taken as establishing that notwithstanding statements to the contrary nickel does exist, in small quantities at least, in the rocks of the eastern part of British Columbia.

In the course of a tour through the mining sections of the Kootenay and Boundary Districts of the Province Hon. Wm. Sloan, Minister of Mines, met members of the Board of Trade of Nelson on Monday evening, the 6th inst., when the question of the French Complex Ore Reduction Co. and of the Ore Testing Plant,

which the Dominion Government proposes establishing in British Columbia, were discussed. In regard to the French Reduction Company it was stated by Mr. Sloan that, the process of treating the complex silver-lead-zinc ores of the Kootenays by the electrolytical process having been successfully demonstrated, the government's object in tendering the Company financial support was accomplished. The plant, it may be explained, now is idle and the government, by virtue of having guaranteed interest on bonds to the amount of $65,000, holds a mortgage covering all the Company's assets. As to the future of the property the Minister said that the government would have liked to see the plant utilized and made the basis of a big commercial enterprise. He thought that it ought to be possible to find some use for it and observed that, in this matter, the government would be guided by the opinions of the Board of Trade and the mining men of the district. He added that the shareholders in the Company, who had invested their money, had his sincere sympathy and it was agreed that they should have a clear month in which to make a start at re-organization. The Minister thought it might not be necessary to go through a foreclosure, or, if such a thing were deemed desirable, that it might be a friendly one, the Company assigning its assets to the government. J. O. Patenaude, speaking for the shareholders of Nelson, said that various mining men had made enquiries as to whether the plant would be available for treating their ores and it was possible that the Company might be able by putting an engineer in charge with the necessary training, to establish a commercial enterprise and at least recoup what had been lost. With reference to the Dominion Government's Ore Testing Plant, Mr. Sloan stated that Hon. Martin Burrell, Minister of Mines for the Dominion, had told him that the Plant would not go to the University of British Columbia at Vancouver. This being so it would not surprise him, he asserted, if it were to be won by the Interior. Answering Mr. F. A. Starkey, commissioner for the Eastern B. C. Boards of Trade, he said that the Provincial Government would be glad to permit the use of the present French Company Plant by the Dominion Government for an ore-testing installation in the event of the Company being unable to organize. Another subject discussed was that of having cabinets of minerals, particularly including specimens of those not familiar to mining men and prospectors of the district, displayed at different points for the instruction of all interested. Mr. Sloan thought it a good idea and said that already it had been adopted in a small way, all the mining engineers having such cabinets at their headquarters. He hoped to extend this to the offices of gold commissioners and mining recorders. The Minister also stated that the matter of supplying prospectors with powder at cost, by means of the same arrangement as that under which the farmers get explosives for clearing the land, was under consideration.

Victoria B. C.

The announcement of the awarding of a contract by the Canadian Pacific Ry. Co. for the extension of its Vancouver Island Ry., the E. & N. from Alberni to Great Central Lake has raised the hopes of mining men interested in the development of the mineral resources of the Island interior. There are a number of properties situated close to Great Central Lake of considerable promise. One of these is the Big Interior which, from engineer's report, consists of a large body of good ore, and the development of which has been much handicapped because of lack of transportation facilities. The proposed new line is 10½ miles in length and will not only open up a promising mineral zone but will tap virgin forests and open to the general public one of the finest sections, scenically, of western Canada.

Vancouver B. C.

Some information was given shareholders as to the development of the Nugget Gold Mining Property, Sheep Creek, at the annual meeting of the Company held recently at Vancouver. It was stated by President A. C. Burdick that the water problem for the Compressor had been solved by restoring the the North Fork Flume and that the Compressor would be operated hereafter full time instead of one shift a day. This would mean better progress in the driving of the crosscut now underway. This now was in 850 feet and would be carried on for the full distance of 1200 feet at the rate of eight and one half feet a day. The crosscut is being driven from the workings of the Motherlode, on the Sheep Creek side of the mountain, under the old Nugget workings on the Fawn Creek side at a depth 600 feet greater than was obtained by former development on the Nugget.

Wilmer B. C.

An option has been given on the Dolphine Silver Lead Property by Randolph E. Bruce, of Wilmer B. C., to delay. The property is situated on the Delphine Mountain, on the north fork of Toby Creek. There are various workings, the principal system consisting of a 30-foot shaft with a right drift 146 feet long, reaching the surface by an incline raise and a left drift 70 feet long, a shallow winze being sunk from this level and other drifts carried from the foot of the winze. The original ore body is stoped out but the formation is such as to promise ore bodies at no great distance. Ore shipped formerly ran about $100 a ton in silver and lead.

Portland Canal

Mr. George Clothier, Government Mining Engineer for the Northeast section of British Columbia, is completing his season in the field by a visit to the Marmot River District. This section has produced some rich silver-gold ore. The first shipments were from the two Marmot Properties—North Fork Basin, owned by William Fraser and Associates the Montana, owned by H. C. Magee and George Bruggie. Lack of transportation facilities made these shipments costly although the properties were only a short distance from tidewater. A number of new locations have been made along the Marmot during the summer and what development has been done has given satisfactory results. It is likely that Mr. Clothier will go into the Bear River section before returning to his headquarters at Prince Rupert.

The newly organized North Coast Branch of the Canadian Mining Institute held a meeting recently at Stewart B. C. with Major Angus Davis, general manager of the Dolly Varden Mine, as chairman and E. J. Conway, field engineer for the Granby Consolidated Mining & Smelting Co. as vice-chairman. Roy Clothier, of Stewart, acted as secretary.

E. E. Campbell, mine manager at Anyox for the Granby Company, in the course of an address, referred to the re-awakening of interest in the Portland Canal District said that he looked to Stewart and the adjacent mineral zone to develop into a really exceptional camp. While it was not generally known, the Granby Hidden Creek Mine was the biggest copper mine in the British Empire. The Dolly Varden, at Alice Arm, was a fine property in a splendid section and he looked for big things there. "I am not given to making prophecies" Mr. Campbell continued "but I prophesy that Stewart will become the chief mining centre in northern B. C. I travelled all over the northwest from Washington to Alaska when I was in the field for the Granby and I never saw a district with the possibilities that this has." Speaking of the aims and objects of the Institute and of work which it might undertake Mr. Campbell mentioned the matter of the removal, or at least the lowering of, the tariff on mining machinery. This duty was one of the chief obstacles to development, especially in the initial stages, the time when mining property required every encouragement.

Barkerville B. C.

Placer gold production in the Cariboo District this season has been considerably in excess of that of last and with development promised on Proserpine Quartz claim, which recently was acquired by eastern Canadian interests, considerable mining activity is assured next year. With reference to the quartz properties, R. A. Bryce who is in charge of the work of opening them up, states that about forty men will be employed during the winter. Word also comes from Stanley that what is described as an important gold strike was made by the Lightning Creek Hydraulic Limited where they are operating above the mouth of Amador Creek. The discovery was made by sinking a shaft about five hundred feet ahead of the face. Here they struck a channel apparently overlooked by the old timers. Manager L. A. Bonner states that the gold is heavy lead-gold and typical of the channel gold of this section. Although the season is well on he expects to make a substantial recovery before operations cease.

Grand Forks B. C.

The four units of the decrepitating plant of the Rock Candy Mill Mine which is ituated some 20 miles from Grand Forks, have been installed and, A. R. Robertson, the superintendent, states, are giving entire satisfaction in operation. The Mill is working to capacity, ore, which is transported to the Mill from the mine by means of an aerial tramway, being handled at the rate of 100 tons daily. For the most part the flourspar is being shipped to chemical plants of the State of Indiana and other of the United States, although, of course, sufficient is diverted for the use of the Consolidated Mining & Smelting Co's Smelter, Trail B. C., this Company being the owner of the Rock Candy. A bunker of considerable capacity has been placed at the Mill from which the concentrates are loaded on cars for shipment and it is expected that the output henceforth will average eighteen cars a week.

Camborne B. C.

Development is to be continued on the Beatrice Mine and other properties of the New Era Mining Company throughout the winter. W. E. Morphy, managing director of the Company, has laid in the supplies necessary to maintain the camp for the next six months and states that preparations are being made for much more extensive operations in the Spring.

Mr. Yip, Mining Engineer, a Chinese graduate of Camborne Eng., has been visiting the mines at Camborne. He has been engaged in a personal investigation of mining operations in the district with a view to the obtaining of practical knowledge that may be turned to account in the development of important mining leases held by his father in China.

Nelson B. C.

Hon. Wm. Sloan, Minister of Mines, visited the Slocan District in the course of a tour he has been making of the Eastern Mining Districts of the Province. He inspected a number of the well-known silver-lead properties of the district, among which was the Silversmith, formerly known as the Slocan Star. Entering on the tenth level, where a good ore shoot was opened up last year, he explored the workings up to the eighth level. Mr. Sloan reports that the new concentrating plant, installed at Alamo by Clarence Cunningham is working well. Good process also is being made on the 200 ton concentrating plant at the Noble Five Mine, it being similar in type to that at Alama. On the Standard, formerly the banner producer of the district, new areas of promise are being developed. The McAllister, Surprise and Ivanhoe are other prospects mentioned by the Minister as being promising. Mr. Sloan stated that he always had been an optimist where the Slocan was concerned and now was more than ever convinced that his faith was justified. Mine operators took advantage of his presence to represent the desirability of the construction of a road connecting the communities of New Denver and Sandon and also of providing means of transportation by wagon road with Nelson by way of Slocan City. Mr. Sloan expressed his appreciation of the benefit these works would be to the mining industry and promised to do all he could to assist in securing the necessary appropriations.

The Evening Star Property, Dayton Creek, near Slocan City, is being opened up with satisfactory results according to William Moore, the Manager. The mine buildings are completed and winter suplies are now being transported to the mine, which is situated at an altitude of 5,000 feet. In the workings the tunnel found the ledge, which now is being followed in the direction that eventually will bring the tunnel under the shaft. A granite dyke 20 feet in width, materially cut down the rate of progress in the drift but the face is again in the vein and two shifts of hand drillers are making good progress. It was Mr. Moore's intention to re-open the Silver Nugget, an adjacent property, this year but it has been decided to defer this work to next season.

That immediate action should be taken by the Dominion Government towards the establishment in the Province of an Ore Testing Plant is the strong and unanimous opinion of members of the Nelson Board of Trade, as well of the mine operators generally throughout the Kooteney and Boundary Districts. The Government has already provided the finances for the enterprise but as yet has taken no steps to construct necessary buildings and install the plant. There has been some discussion as to the most suitable site but it is thought that Nelson, now that it does not seem likely to go to the B. C. University, Vancouver, will

be chosen. Arguments for the proposed testing plant are well set out in a telegram forwarded by the Nelson Board of Trade to the Ottawa authorities which, in part, reads as follows:

"It is imperative that the Government should take up the question of the treatment of complex ores. Hon. Mr. Sloan, Provincial Minister of Mines, in discussing the matter, referred to the instance of the Consolidated Company of Trail, who have for years been experimenting with the ore from their Sullivan mine, spending several thousand dollars in the work and who now have made a complete commercial success of the treatment of these ores. It also was shown that such properties as the Slocan Star, the Cork-Province, the Rosebury-Surprise, and the Noble Five are now in a position to treat their ores to the best advantage, but only after constant, tedious and expensive research and experiment.

" It is self-evident that while wealthy corporations such as those mentioned can afford to undertake the risk of making large expenditures in that direction it is quite beyond the means of smaller concerns and individual owners to do so. It may be well to state here that the aggregate of the holdings of that class of owners covers by far the larger part of mining properties of the Province, which could be made productive on a paying basis.

"Therefore the meeting, after listening to the possibilities of the mining industry from competent authorities was unanimous in claiming that it was the duty of the Government to provide a suitable Plant, which will give the smaller concerns the necessary facilities for ascertaining the proper and most economical treatment for their complex ores."

Among other improvements decided upon by the Nugget Mines Ltd. in connection with the development of their properties at Sheep Creek is the re-building of the broken portion of the pipe-line from the north fork of Sheep Creek, only the line from the south fork having been in use since the new Company took over the Nugget and the Motherlode mines. This condition led to a water shortage at the Motherlode Compressor during the recent dry season which it is not intended shall be experienced again.

At the annual meeting of the Eureka Copper Mines Ltd., held recently at Nelson, officers were elected as follows: President, J. J. Malone; secretary-treasurer, J. G. Bunyan; directors, J. A. Gibson, L. K. Larsen, and J. G. Bunyan, of Nelson, and S. G. Campbell, of Vancouver. The property of the Company, the Eureka Gold Mine, Eagle Creek, is under lease and bond to the Inland Mining Company, of Walla Walla Wn., which has grouped it with the Granite-Poorman Property, the mill of which is crushing Eureka ore.

In this connection it is interesting to note that the Granite-Poorman Mill is to have its capacity increased from 50 to 150 tons, that the right-of-way now is being cleared on the line recently surveyed for the new 6000-foot link of aerial tramway from the Eureka workings to the upper terminal of the Granite-Poorman tram, and that the offices of the Vincent Development Company, which is developing and operating the properties for the Inland Mining Co., are to be moved from Walla Walla to Nelson. The Mill, which has been operating for months on ore taken from No. 2 or the main working level of the Eureka, is to be closed down in order to undergo a thorough overhauling and also to permit the extension proposed. The existing Granite-Poorman tramways also is to be put in shape, so that it will be ready to operate in conjunction with the Eureka section when the latter is completed.

A development of the last two months is the opening up of a new ore body on the main working level, which has been explored by drifting a distance of 150 feet, with the face still in ore. The closing of the Mill will not interfere with the continuance of development on this new ore body nor the work of the crosscut on No. 4 level, which is now in 500 feet.

Trail B. C.

Much interest has been aroused among British Columbia mining men by a statement made in London England recently by J. J. Warren, president of the Consolidated Mining & Smelting Co. of Canada. Mr. Warren is engaged in negotiating the sale of the company's zinc output. He said that the market possibilities for the company's product in Europe, South Africa and India are unlimited as regards the disposal of zinc. Canada can supply 10 per cent of the world's demand, equal to 780,000 tons of zinc, and is only producing 25,000 tons. Mr. Warren further stated that the impression he has gained is that the condition of the market warrants expansion to supply these 780,000 tons and he foresees no difficulty in arranging for increasing smelting facilities.

This statement, taken with the recent pronounced activity of the Consolidated Mining & Smelting Co. in British Columbia, is regarded as significant. For instance there is the report, as yet unconfirmed officially but believed to be authentic, that the Company proposes to install a large concentrating plant at Kimberley for the purpose of treating the ores of the Sullivan Mines, which are the largest producers of zinc ore in this Province and which possess almost unlimited reserves of such ore. It is the opinion of competent mining men that if the Company decided to work these mines on a big scale, and encouraged considerable increases in production on the part of independent owners of silver-lead-zinc properties, the production of British Columbia could be brought to the point indicated. In considering this matter it should be borne in mind that the Company's metallurgists at Trail B. C. have solved, according to official announcement, the problem of economically treating the complex ores of the Kootenay Districts.

Ore receipt in gross tons for the week from October 1 to the 7th inclusive at the Trail Smelter of the Consolidated Company aggregated 4,072, making a total for the year of 262,395 tons. The largest independent shipper was the Josie Mine, Rossland, with 502 tons. Next came the Mandy, of Le Pas Manitoba, with 468 tons. Other considerable contributors were the North Star, Kimberley, with 404 tons; the Black Bear, Rossland, with 231 tons; the Blue Bell, Riondell, with 183 tons; the Lone Pine, Republic Wn., with 114 fons; and the Highland, Cedar Creek, with 104 tons. The effect of the strike of miners at the Sullivan Mine, Kimberley, owned by the Company, is clearly evident, shipments having dropped to 62 tons, so that the only Company mine shipping in quantity is the Centre Star, of Rossland, which shipped 1400 tons of ore.

Prince Rupert B. C.

V. H. Todd, one of the engineer's staff with the Granby Consolidated Mining & Smelting Company, has returned to the coast after spending the season in charge of diamond drilling operations on properties in which the Company is interested on the Ecstall River, about 30 miles south of Port Essington B. C. Mr. Todd says that there are a number of men employed there at present but that the work will be closed down shortly for the winter. There are a number of promising prospects on the Ecstall and it is likely that the Company will start operations on a large scale next year.

Atlin B. C.

The gold output of the Atlin (B. C.) District for the season of 1919 is placed at $250,000, a considerable decrease in comparison with the usual production of approximately $400,000. Lack of men is given as the reason for this falling off by Frank Mobley M. P. P., who returned recently from Atlin, and who is the owner of the Discovery Mining and Power Company. He stated that the output of this Company will total $25,000. It is situated on Pine Creek and has been in operation all summer. Mr. Mobley does not expect that the profits will be great because of the increased costs of labor, equipment etc. He further asserts that only about 150 placer miners have been at work in the district this season, most of whom were engaged on Spruce Creek.

With reference to the Engineer Mine, one of the best known and probably the richest lode property of the Province, Mr. Mobley explains that, owing to the drowning of its owner Capt. Alexander and his wife when the Star "Princess Sophia" was wrecked last year and to the subsequent death of his heir at Pittsburg, no work has been done this year.

Dawson Y. T.

Navigation on the Yukon River was closed on the 8th of October. The movement of Yukoners to the Coast for the winter was not as great as usual, owing chiefly to reports of unrest on the outside and to the fact that silver mining prospects are very bright in Mayo, Twelve Mile and Fairbanks camps, where many will be engaged . The usual winter gold mining also requires many men.

Robert Leeson, a sourdough of the Klondyke, has left Dawson for Ulster, Ireland, to claim the title and estate of the Earl of Milltown, which is reported to carry with it an ancient castle and many valuable properties. Leeson is a member of the Yukon Order of Pioneer. He has been engaged for years in placer work in the Yukon and all this summer wielded a 20 pound sledge in the Guggenheim mines. No big strike came the way of Leeson who left to claim his heritage clad in a brown woollen shirt, hobnailed boots, and with his baggage slung over his shoulder.

Nome, Alaska

Prospectors recently returned to Nome report an interesting discovery near the head of Norton Sound of a large deposit of red ochre, valuable for its paint making properties. Natives say that their people have used as material for coloring purposes for generations. The same prospectors also found a vein of hematite seven miles from Norton Bay Mission. A tunnel some fifty feet deep, penetrating into the cliff side, and exposing at its extreme depth a ledge of ore about 10 feet wide, was disclosed by the clearing away of debris at the entrance. The theory is that this property was the scene of ancient mining operations, although none of the natives seemed to know anything of such work there during their lives nor to have any knowledge of any legend relating to the same.

Salmon River B. C.

In the Salmon River District, Portland Canal, Northern British Columbia preparations already are being made for winter by the various mining companies. It may seem early for this but the snow comes early and stays late in the hills of this region. While it is impossible as yet to say just how many men will be employed in the various camps throughout the winter it is certain that there will be a substantial payroll and that the centres of Stewart and Hyder will continue to be quite bustling and active throughout the closed season.

Among the companies which will continue to operate are the Premier, Bush, Big Missouri, Forty Nine, Mineral Hill and the New Alaska, the latter being on the Alaska side of the boundary line. These all are in the Salmon River section. On Bear Creek it is expected that the Lakeview, recently bonded by P. Welch and associates, and possibly the George Copper Properties, will maintain operations. While all these properties are reported to be in such shape that work can be continued through a hard winter the mainstay will be the Premier on which a considerable force will be employed. During the summer the efforts of the Premier Company have been devoted to a large extent to road building, and this necessity to ready transportation will be completed soon. On the Big Missouri diamond drill operations thus far are said to have been highly satisfactory. A similar report comes from the Forty Nine Property on which drilling is in progress. It is said in regard to the latter, that the short tunnel which was driven to intersect the vein encountered high grade ore which is being drifted on.

Generally those interested in Salmon River Properties are satisfied with the season's work. The development on many properties has been almost all that was hoped for—it would be difficult to get results that would be 'all that was hoped for'—and mine operators and prospectors are looking forward to next summer.

With reference to the Lakeview it is announced that work again has started on this group of claims. Spokane interest had the property optioned but let the property go after a little work. P. Welch and H. J. Fetter then took up the bond and development will proceed under the direction of Al. Harris, superintendent of the Mineral Hill. The Lakeview is situated on the north fork of Glacier Creek, about two and a half miles from Bear River. At the outcrop the vein is nine and a half feet wide. It is considered a promising property.

It would appear from the reports of prospectors who have been engaged on the Naas River side of the slope, as well as from samples with which they have returned, that the Salmon River formations and character of ore extends further than was originally figured. The Spider prospect, which is said to be very promising, is in this area. Besides miners have brought specimens from claims staked nearby which are shot with native silver. Some high grade ore also have been brought from the late discoveries across the glacier from the Big Missouri. There are a number of locations there and on property known as the Motherlode Group a wide vein of this ore has been uncovered. George Clothier, government engineer, intends visiting this ground before returning south.

Slocan B. C.

The concentrating mill in connection with the Noble Five Mine at Cody B. C. is in shape for the installation of the machinery. When completed it is expected to be the most complete mill in the Province.

THE COLLIERIES.

Returns of the production of a number of the Vancouver Island Collieries for the month of September follow:

No. 1 Mine, Canadian Western Fuel Co.	27,340
Harewood Colliery, "	19,302
Reserve Colliery, "	5,453
Modern Colliery, Pacific Coast Coal Mines	5,501
Jingle Pot Colliery, B. C. Coal Mines Co. Ltd.	3,344
Grant Colliery, Nanoose Coal Mining Co Ltd.	2,306

From the above figures it will be seen that the Reserve Mine, of the Canadian Western Fuel Co., although re-opened, is not yet up to normal in its output.

The coal mines of the Crow's Nest Field, Eastern British Columbia, are gradually being brought back to normal in point of production, although it need scarcely be said that it takes time to recover lost ground after a strike such as that through which the district has passed. The output now is about 80 per cent of what it was and an improvement is being shown each month. The coke ovens at Fernie are idle and it is thought likely they will remain so for some time. Those of Michel B. C. are operating only on a limited scale, the demand for the product being comparatively light at present.

The collieries of Vancouver Island are working steadily, there being no signs at the moment of anything but the best of feeling between the employed and the employer. Generally speaking the miners are working on the understanding that, with further increases in the cost of living, their wages advance. This applies to most with the exception of the Canadian Western Fuel Co., and the relationship between the latter and its men, as a result of the recent adjustment of the wage question, is of the best. The product, for the most part, is being used to care for the domestic demand which now is heavy because of the approach of the winter. From North Vancouver and other district comes the report that difficulty is being experienced in obtaining sufficient to take care of current orders. For this reason there is a belief that a shortage of coal may be experienced before the spring. This, however, is speculation. Responsible opinion appears to be that the collieries can be depended upon to take care of the local situation and, in any event, there is no serious shortage as yet.

At the annual meeting of the Mine Rescue and Ambulance Association of the Canadian Western Fuel Co., which was held recently at Nanaimo, J. Thompson was elected president; E. V. Paterson, secretary-treasurer, with J. W. Jensen as assistant; and to the Executive Committee, in addition to the chairman of the various committees, were appointed W. H. Moore, George Yarrow and George Moore. A feature of the proceedings was the presentation of $100 to the winners of competitions at the Labor Day Meet in Nanaimo under the auspices of the Mine Safety Assiciation of Vancouver Island. Mr. Moore explained these prizes were not in the nature of payment but were provided by the Company in recognition of the hard work to which the men had been subjected in preparation. The recipients were members of teams captained by J. W. Jensen, George Carson, J. Barton, J. Brown, A. McNill, R. Channock, J. McCourt, and M. Guinniss. It was decided that a paper on first-aid work would be delivered monthly before the members of the Association. This is only one of the arrangements made to sustain interest during the ensuing few months and to promote the object of the Association, namely, the equipping of every miner for practical help in case of need.

The Coalmont Coal Mining Co. is producing about 150 tons a day. The coal is shipped to the Kettle Valley Ry. by truck. Negotiations are in progress for the construction of a railway spur to the property which has turned out well under development.

The recent ligitation with reference to the title to coal rights within the foreshore lands of the Eastern Coast of Vancouver Island, which now is declared to lie with the Province, and the report that steps may be expected towards the opening up of the coal deposits of Suquash and vicinity on an extensive scale, have made the reports of Dr. Charles H. Clapp and Dr. B. D. Dowling, the two principal geologists to investigate this area, of special interest. Dr. Clapp in his report on the industry in Memoir 51 of the Geological Survey Series, says:

"The future of the coal industry is very promising, although thinner and deeper coals will have to be mined in the near future. As already stated, two new shaft mines have reached the Douglas seam in area of 181 square miles."

In his estimate of coal resources Dr. Clapp places the production at 24,500,000 tons up to 1912 and it recently estimated that the figure now would stand at about 30,000,000 tons. Dr. Dowling places the probable resources of the Nanaimo field at 1,340,000,000 tons.

The coal occurs chiefly in the lower part of the Nanaimo series in three seams, the Wellington, the Newcastle and the Douglas. The lowest seam, the Wellington, lies at the base of the Extension formation and rests on the East Wellington sandstone, and is about 700 feet above the base of the Nanaimo series. The Newcastle seam occurs at the base of the Newcastle formation, and overlies the Wellington seam by about 800 to 1,000 feet. The Douglas seam is contained in the Newcastle formation and from 25 to 100 feet above the Newcastle seam.

The coals of the various mines are as a whole much alike, and are high volatile bituminous coals of fair quality. The amount of fixed carbon in the best quality ranges from 45 to 60 per cent and the ash from 5 to 10 per cent. The coal, especially that from the Wellington seam, coke readily.

The aerial tramway from the Sovereign Mine to Sandon is in operation, having been completed about two weeks ago. The designing and building was carried out under the direction of E. O. White. The length of the tram is 8000 feet, the longest span 1700 feet, and the highest tower 98 feet. It is one of the finest aerial tramways in the Slocan District and was commenced on May 8th last.

WANTED—Young man with mining or chemical engineering education, to take laboratory position with opportunity for advancement. Reply giving full particulars and references to care, Secretary, Canadian Mining Institute, 503 Drummond Bldg., Montreal.

The Board of Trade of the City of Prince Rupert is bringing to the attention of the Canadian Government the importance of the construction of a branch railway to connect the Grand Trunk Pacific Ry. with the Groundhog Mountain Coal Fields of British Columbia. A recent resolution asks that an investigation be made of the most feasible route for such a railway and gives many reasons why the authorities should interest themselves in the enterprise. Among the latter is that the Groundhog coal field, which lies undeveloped, "embraces an area of between forty and seventy square miles in which competent geologists report are situated extensive coal deposits, the quality of the coal varying from bituminous to a high class anthracite, not surpassed by the best Pennsylvania products." Also that within the same area are important metal mining possibilities at present dormant and that the question of fuel supplies under the protection of the British flag has an important bearing on our national life.

NORTHERN ONTARIO.

The Prince Visits Cobalt.

The Cobalt mining camp on October 16th extended a fitting welcome to His Royal Highness the Prince of Wales. Miners, prospectors, ladies, children, business men and northeners of many different tongues, races and creeds mingled in great masses on the principal streets and along the route of the Royal procession as it wended its way through the silver city and to the mines. Never before in the history of the North has such a scene been witnessed. Never in this country's past has the citizenry paid such tribute to even a Royal personage, and never has the people so long noted for their lack of impulse been seen to throw their traditional reserve aside and offer spontaneous welcome. It was a scene unprecedented in the North and a fitting tribute to their future King.

Following the addresses of welcome and the presenations the Royal party was conveyed in a long train of automobiles, first to theConiagas mine and had a brief view of the silver ore in process of milling. After this, the refinery of the Mining Corporation of Canada was visited. where His Royal Highness witnessed the molten silver being poured out into bars. The party next proceeded to the O'Brien Mine, by way of the McKinley-Darragh and Kerr Lake mines. At the O'Brien the Prince was taken into the mine and permitted to view in person the underground workings and see in actual application by which the silver mines of Cobalt have added more than three hundred million ounces of silver to the wealth of the British Empire.

THE GOLD MINES.

Hollinger Production.

When during the twelve weeks ended Sept. 9th, the Hollinger mine produced $1,673,220,12,, it showed an average of $557,740.40 every four weeks of which some $295,373.48 was net profit.

For the year to date, according to official figures the output has averaged $537,760.61 every four weeks. Taking the latter figures as a basis of calculation the output for the current year will approximate $7,000,000. The rate of gross production as shown in the last twelve weeks covered by the report just issued would approximate $7,246,287.10 a year.

During the year to date the mill of the Hollinger has been running at only 69 per cent. of possible running time due to the shortage of labor. As evidence of a higher rate of earnings, the company realized a net profit of $295,373.48 every four weeks during the twelve weeks ended Septmbr 9 as compared with an average of $267,320.82 every four since the beginning of the year. This would indicate a net profit of $3,475,170.66 for the whole of the current year, and by utilizing equipment at only a little over two-thirds capacity This is at the rate of about fourteen per cent. on the companies issued capital. From this must be deducted about $300,000 at the cost of expenditures for the plant, thus reducing net profit to about 12½ per cent.

It can therefore be seen that the predicted 1 per cent. dividend every four weeks instead of every eight weeks as at present will depend upon whether or not more men can be secured. In order to disburse 1 per cent. four-weekly, a net profit of $246,000 is necessary every twenty-eight days, after making due allowance for expenditure on plant as well as providing for depreciation of plant. Only a slight increase in output is all that is necessary to see this realized, and as the end of the year approaches interest is centering keenly on the outlook for a greater quantity of labor.

A group of claims owned formerly by the Boyce Syndicate in the Porcupine district, has been taken over by new interest and will be known as the Gold Centre Mines Ltd., with an authorized capial of 3,000,000 shares of the par value of $1 each.

The property consists of 160 acres and lies about one mile east from the productive area of the Hollinger Consolidated, and is in a section of the camp where only a limited amount of work has been so far undertaken. Statements eminating from Porcupine declare that the property adjoins the Hollinger. While this is true, it is mis-leading for the reason that the part of the Hollinger which the property adjoins is a fraction about one mile in length which stretches straight east from the main group of the Hollinger. This easterly strip of Hollinger territory has never been productive. The property is also situated about three-quarters of a mile from the productive area of the McIntyre-Porcupine.

The Gold Centre has the advantage of being situated on the railway, and also has the transmission line of the Northern Canada Power Company passing over it. Due to only a limited amount of work having been previously carried on in that section, its exploration would be important inasmuch as it would tend to indicate the possibilities of carrying on successful work on a number of other promising properties in that area.

THE SILVER MINES.

During the last six days in September the Nipissing mine produced an average of about $11,000 a day, or a total of $66,395, the mill having been opened on the 24th.

In his regular monthly report to the president and directors, H. Park, manager says.—The recent strike, called by the Western Federation of Miners on July 23rd, was called off on September 8th. Dewatering the several shafts was commenced immediately and by September 24th sufficient levels were accessable at the 73 shaft to start the low grade mill, which has been running at capacity ever since. General opera-

tions underground will gradually be increased to normal as lower levels become available.

During the month of September the company mined ore of an estimated vaue of $66,395 and shipped bullion and residue from Nipissing and custom ores of an estimated et value of $648,737. The lowgrade mill treated 1721 tons of low grade ore. The new high grade plant treated $130 tons. The refinery shipped 525,695 ounces of fine bullion.

The following is an estimate of production for the month of September:—

Low grade mill	$49,907
Washing Plant	616,488
Total	$66,395

During the month of September the Kerr Lake mine produced upwards of 60,000 ounces of silver. The strike was called off only on Sept. 7th, after which date it can be seen that production averaged not far under $3,000 every twenty-four hours, or an almost normal average. This represents one of the quickest recoveries from the effects of the strike some of the leading mines have occupied from one to three weeks to recover.

The foregoing achievement appears to indicate a probability of the current fiscal year being quite profitable for the Kerr Lake.

The Lake Shore Mine has already secured sufficient men with which to resume production at full blast. But for the necessity of installing a conveyor to transport ore from the surface dump to the mill pending the completion of the pumping out of the mine, production would have been reached a few days earlier.

No further labor difficulties are anticipated in that the men have broken away from the influence of the Western Federation of Miners' and have decided to cooperate with the company for the best interests of themselves and of the mining industry.

The correspondent of the "Journal" is officially informed that as the result of exploration work on the Gans lot of the Temiskaming mine, considerable success has been met with, some rich patches of ore being encountered.

In the South end of the Gans area, where a considerable amount of development work had been previously done without any successful results, the discovery of silver-bearing ore was made on April last, upon which efforts have since been concentrated in the endeavor to prove its extent and value.

The occurrence exists in the 506 vein where a small patch of ore was first found in a raise put up above the 500-ft. level. Three raises have since been driven to a height of 70 feet and at 35 feet above the 500-ft. level a sub drift has been extended for a length of 115 feet. The vein, which is showing for this length, averages 3 inches in width but is of very uncertain character, occasional rich patches of ore alternating with barren sections so that it has been impossible, so far, to make any definite statement with regard to its possibilities from a productive point of view.

The policy adopted by the company endeavoring to prove its prospective value before publishing information was done entirely in the interests of the shareholders, says an official, and results have shown that any premature anouncement of the discovery would have been advisable in view of the possible disappointment.

Further development work is being actively prosecuted by continuation of three raises at intervals covering a length on the vein of 220 feet, and the extension of the South drift at the 400-f. level to connect these.

While the work above described has been in progress, exploratory work in the older workings at the South end of the 575-ft. level, in the vicinity of the Keewatin-diabase contact has proved successful in locating a body of good grade milling ore. In addition, one or two small pillars of high grade ore have been extracted which have helped to maintain the output on a paying margin during development of the 506 vein in the Gans section.

COLLAPSE OF THE KIRKLAND LAKE STRIKE.

The decision to resume production at the Lake Shore and at the Teck-Hughes mines, at Kirkland Lake, marks the complete collapse of the labor strike which commenced there on June 12. The statement of D. L. H. Forbes, manager of the Teck-Hughes mine published in the "Journal" of last week makes the situation quite clear. In referring to the men now being engaged, and the efforts of the radicals to dissuade them from going to work, Mr. Forbes used this crisp phrase:—

"Our answer to this is that the men we are now engaging are the real employees who will have permanent employment in this district, and, the socialists, by their unfair tactics and greedy scheme to create a monopoly of labor here, have forfeited any right they may ever have had to be considered as our workmen."

Such appears to express the general sentiment of the mine operators in the Kirkland Lake field, and, indeed, represents the sentiment of a majority of the employees. For considerable time these men have expressed a desire to return to work but have been prevented from doing so by the radical minority.

In regard to the question of wages and hours, which already compare favorably with other gold mining camps in the Dominion, Mr. Forbes has this to say:—

"Any alterations and adjustment of the wage scale or working hours must come as a result of conference and cooperation by the Workmen actually in their (the companies) employ and not as a result of a strike precipitated by socialist agitators most of whom were merely parasites on the real workmen of the district."

In the light of the foregoing assertions, the labor strike in the Kirkland Lake field has been a success not alone for the mining companies, but equally so for the real workmen of the camp. By reason of the ridiculous situation created by the radicals the workmen have become freed from the insidious presence of the "red element" which has made Kirkland Lake its rendezvous for the past two or three years. The real workmen are now in a position to discuss questions with the mine managers and join whole heartedly in the general invitation to cooperate for the general good of the mining industry. This puts the companies in a position where they may lay their future plans with a knowledge that they will be dealing with intelligent men and not with desciples of Bolshevism and irresponsible persons.

It is interesting to note that, following the decision of the mines to resume work and break the strike, the union has decided to call off the strike.

ST. REMI KAOLIN DEPOSITS, AMHERST TOWNSHIP, QUE.

Memoir 113, just issued by the Department of Mines, describes the geology and mineral deposits of the southern part of Amherst Township, Labelle County, Quebec, with especial reference to the occurrence of kaolin near St. Remi. The Memoir is the work of M. E. Wilson of the Geological Survey.

The introduction to the Memoir states that although deposits of china clay are known to occur in numerous localities in Canada, they are of small extent and not of commercial importance. Furthermore, since kaolin commonly occurs in such relationships as to indicate that it has been formed as a product of surface weathering, and throughout a large part of Canada, the products resulting from such alterations have been, for the most part, removed by the erosive action of the continental glaciers, it is probable that deposits of kaolin, on the whole, are less abundant in Canada than in parts of the world where Pleistocene continental glaciation did not occur. The St. Remi occurrences are therefore of unusual importance to Canada.

A history of the development of the China clay deposits is given, which is as follows:

In the summer of 1894, Milion Thomas, while digging a well on the farm of Philibert Tasse, encountered kaolin at a depth of 15 feet and sent a small quantity of the material to Richard Lanigan of Calumet, who identified the sample as kaolin and purchased the right to mine the material from the owner of the property. No attempt was made to determine the extent of the deposits at that time, however, and it was not until 1911 that actual development work on the deposits was commenced.

In the autumn of 1909, Mr. F. R. Lanigan, of Montreal, acquired from the government the mining rights to parts of lots 4, 5, 6, 7 and 8, range VI, south, Amherst township, and in 1911, having leased these rights to Mr. J. C. Broderick of Montreal, formed the St. Remi Kaolin Company, to take over the ownership of the property. In 1911, some development work was performed and the construction of a washing plant begun by Mr. Broderick, and in 1912 the Canadian China Clay Company was organized to continue mining operations under the terms of Mr. Broderick's lease. In 1913 the Canadian China Clay Company purchased the mining rights to parts of lots 4 to 8, range VI, south, Amherst township, from the St. Remi Kaolin Company; the mining rights to parts of lots 2 and 3 and additional parts of lots 2 to 8, range VI, south, Amherst township, from the government; and the surface rights to all these lots, from the local owners. Since that time the washing plant on the property has been enlarged, some trenching, stripping, and drilling for the purpose of developing the deposits completed, and several thousand tons of kaolin produced. Prior to 1916 the washed product had to be transported by wagon to Huberdeau, the terminus of the Huberdeau branch of the Canadian Northern railway, but in that year the railway was extended to the china clay deposits so that the cost of transportation from the mine has been greatly reduced.

The only known deposit of kaolin in the district, outside the area owned by the Canadian China Clay Company, occurs near Pike creek, on lot 8, range 4, Amherst township, and is owned by Mr. A. Lanigan of Calumet. This deposit, which had been known to Mr. Lanigan for a number of years, was staked by him in December, 1911.

The St. Remi occurrence of kaolin is unusual in that it appears to have been deposited within a fracture zone, and the indications are that the mineral was not developed in place, but was carried into the fractured zone from an outside source. Since the deposit is largely hidden by the boulder clay the extent of the mineral present is not even approximately known, but the enormous size and abundance of the kaolin leads so far bare by trenching and stripping indicate "that there are good prospective possibilities for the discovery of enormous masses of the material.

In the St. Remie district there is also some graphite, associated with a ridge of Grenville limestone, but apparently the deposits are too irregular and discontinuous to be profitably mined.

The Memoir is accompanied by a number of good photographs, and two maps. The general geology of the district and the rock characteristics are exhaustively described.

HAIL HOOVER!

Old Abou Ben Adhem, in his "deep dream of peace"
Had nothing on Bert Hoover with his war bread recipes;
For Abou loved his fellow men, according to the scribe,
While Hoover loved and fed them too, of every race and tribe.

Through war's dread reign he garnered grain in all the seven seas;
To every famine-stricken land he sent his argosies.
That he's our leading dough-boy is clearly manifest;
In head-lines and in bread-lines "his name led all the rest."

Then cheer, cheer for Hoover, the mining engineer,
Philanthropist and statesman and matchless financier!
No chronicle of history a worthier feat narrates.
Thrice welcome, Herbert Hoover, home to United States!

Anon.

—From the A.I.M. & M.E. Bulletin.

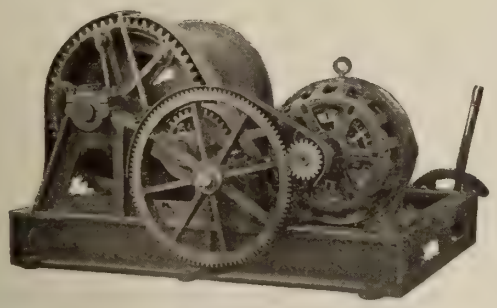
MINERAL OUTPUT OF THE U.K.

The statistics of the mines and quarries in Great Britain and Ireland during the year 1918 are dealt with in the report of the Chief Inspector of Mines, and issued as a White Paper by the Home Office.

The principal outputs of minerals were: Coal, 227,748,654 tons, as against 248,499,240 tons in 1917; iron ore, 14,613,032 tons, as against 14,845,734 tons; and limestone, 10,156,603 tons, as against 10,454,717 tons. The grand total output of all minerals was 273,988,449½ tons, as compared with 295,401,139½ tons for 1917.

OBITUARY.

We regret to record the death at the age of 40 of Duncan McD. Campbell, B.A., B.Sc., a member of the Provincial Board of Nova Scotia, and formerly Engineer of the City of Sydney. Mr. Campbell, in his professional work as a civil engineer, has taken an important part in the civic engineering associated with and arising out of the industrial development of Sydney, Nova Scotia. He was highly regarded by brother engineers in Nova Scotia, and although of a retiring and studious nature, is widely regretted by all who had occasion, through personal acquaintance, to know how conscientiously he carried out his professional duties, and his sterling personal character.



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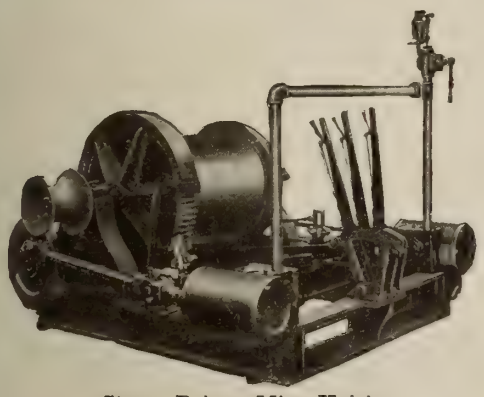

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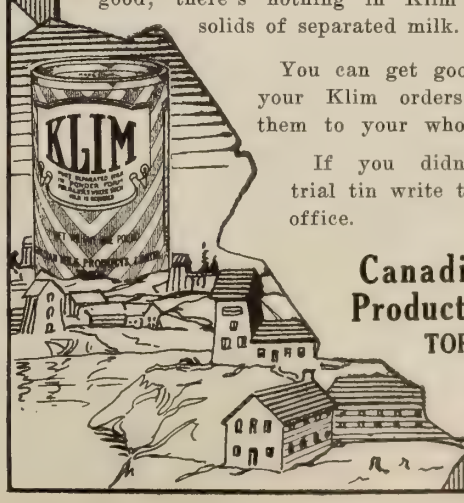

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LIMONITE DEPOSIT NEAR LILLOOET, B.C., FROM OUR B.C. CORRESPONDENT.

Large deposits of limonite iron ore, carrying high percentages of mineral with small percentages of impurities, and suitable in a superlative degree for fluxing with the known extensive magnetite iron deposits of the Province in the production of pig iron, were reported some months ago on the Taseko (Whitewater) River, Clinton Mining Division. The exact location, it was ascertained subsequently, is some miles from Lillooet, not many miles from the Pacific Great Eastern Railway.

In compliance with the application of the stakers, and acting under the authority of the Mineral Survey & Development Act, Hon. Wm. Sloan, Minister of Mines, instructed Wm. Brewer, one of the government mining engineers, to visit and submit a report on these properties. This he has done and his findings, while his conclusions are general and his estimates no more than approximations owing to the short time he was able to spend on the ground, are of so favorable a character that Mr. Sloan felt further investigation to be important. To this end, with the approval and the consent of Hon. Martin Burrell, Minister of Mines for the Dominion, the services of S. J. Schofield, senior geologist with the Geological Branch, Ottawa, were secured. Mr. Schofield and party, accordingly, have left for the Whitewater, the former's instructions being to make as thorough an examination of geological and local conditions and to prepare a report at as early a date as possible. As this report may have a considerable influence on any action that may be taken by Capital towards the establishment of an iron and steel industry in the Northwest it is satisfactory to know that Mr. Schofield is a geologist of the highest attainments, commanding the confidence of the mine operators of America. He surveyed the Cranbrook Map Area, has done other important work in British Columbia and in Canada, and was engaged in a geological survey of the Britannia Geological Field of the time he was requested to make the trip to the iron deposits in question.

Mr. Brewer, referring to the quantity of ore on the Whitewater, states that "the superficial area covered by the various exposed deposits examined—is roughly estimated at four hundred acres, but there is a possibility of this extent being much larger because in places there are indications of ore deposits at present covered by tallus, grassy hummocks or hidden by timber. In estimating tonnage of actual ore, meaning thereby such quantity as development has exposed as measurable and immediately available, the only method to adopt in the absence of development work, is to credit the various deposits with an estimated average thickness, judged from experience in mining similar deposits." He then proceeds to estimate, with the foregoing qualification, as follows:

Actual Ore—7,200,000 tons carrying above 40% metallic iron.

Probable Ore—15,000,000 tons carrying above 40% metallic iron.

Possible Ore—50,000,000 tons carrying above 40% metallic iron.

"No consideration," it is added" is given to samples of partly mineralized rock which assayed 20.2 and 16.4 per cent iron."

Discussing the quality of the ore, Mr. Brewer states that assays of samples taken during the examination show that the material classed as ore contains from 41 to 50 per cent metallic iron; that four out of nine of these samples contained only traces of phosphorus, one sample 0.04 per cent, and the remaining four 0.23 per cent, 0.21 per cent, 0.85 per cent and 0.52 per cent, respectively. These results place five of the samples within the Bessemer limit, with the remaining four above the Bessemer limit, but not in excess for the basic or open hearth process of making steel. "These results," he continues," show that the ore can be used either in a blast furnace as the entire charge of iron ore or will make a most desirable mixture for combination with the magnetite ore of the Province."

As to the cost of mining it is said that these deposits of limonite are so located and made up of such comparatively friable material that they can be mined with a steam shovel and the cost of the actual mining, it is figured, should not be above 25 cents a ton.

In reference to transportation it is pointed out that there are at present no transportation facilities nearer than Mission on the Pacific Great Eastern Ry., at least sixty miles distant from the occurrences of iron ore described. Therefore, before any statements can be made, relative to the future facilities, surveys are necessary to determine the most feasible route as well as the location of the manufacturing plant for treatment of the ore.

PORT ARTHUR DISTRICT VERY ACTIVE.

There are unmistakable symptoms of renewed mining activity in the mineral areas tributary to Port Arthur.

Iron and silver ores are the two most active factors in the revival. For the first time in twenty years this district will get credit for silver production, at least four mines will be operated continuously during the winter, and several others are being investigated.

Smith & Travers, of Sudbury, are diamond drilling the Leitch iron lands, and are meeting with extraordinary results. These lands are situated 130 miles east of Port Arthur, and about six miles north of the Canadian National Railway, at Beardmore station. Particulars of the results cannot be divulged at present. The drilling is being done for United States interest.

The Little Long Lake iron lands, principally owned by Capt. H. E. Knobel, J. W. Wolvin and John A. McKechnie, are on the same range as the Leitch lands. This tract has recently been examined by an Engineer of national reputation, who was greatly impressed by the length and breadth of the deposit, and the character of the ore showing on the surface. Diamond drilling has been recommended, with every certainty that large bodies of merchantable ore will be disclosed. The occurence of specular hematite, so intermixed with medium and high grade magnetite as to bring up the tenor very perceptably, makes this deposit very interesting.

Amongst the prominent Mining Engineers and Corporation representatives who have recently visited the Port Arthur area, are, Prof. H. E. T. Haultain, Toronto University, G. C. Bateman, La Rose Mining Co. Cobalt, W. L. Hughes, Mining Corporation, Cobalt, J. P Sparks, Temiskaming Mining Co. Cobalt, R. G. McConnell, Deputy Minister of Mines, Ottawa, M. Davis, The M. J. O'Brien Corporation, Ottawa, R. Y. Taylor-Blount, London, Eng., J. B. Tyrell M. E., The Anglo-French Corporation, London, Eng., C. W. Knight, Assistant Provincial Geologist, Toronto, Mr. Spence-Thomas, Cardiff, Wales, Mr. J. C. Murray M. E., and many others.

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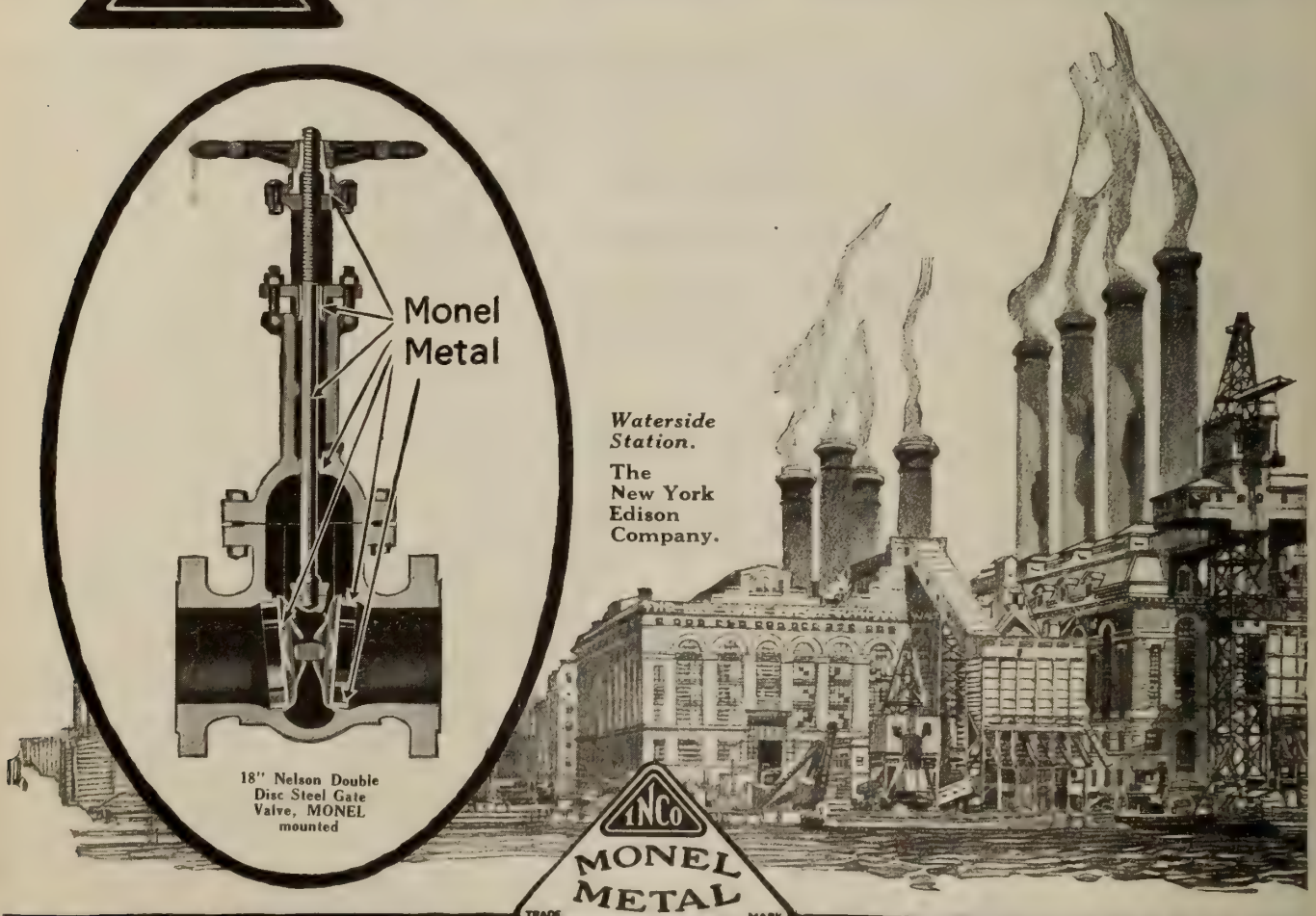

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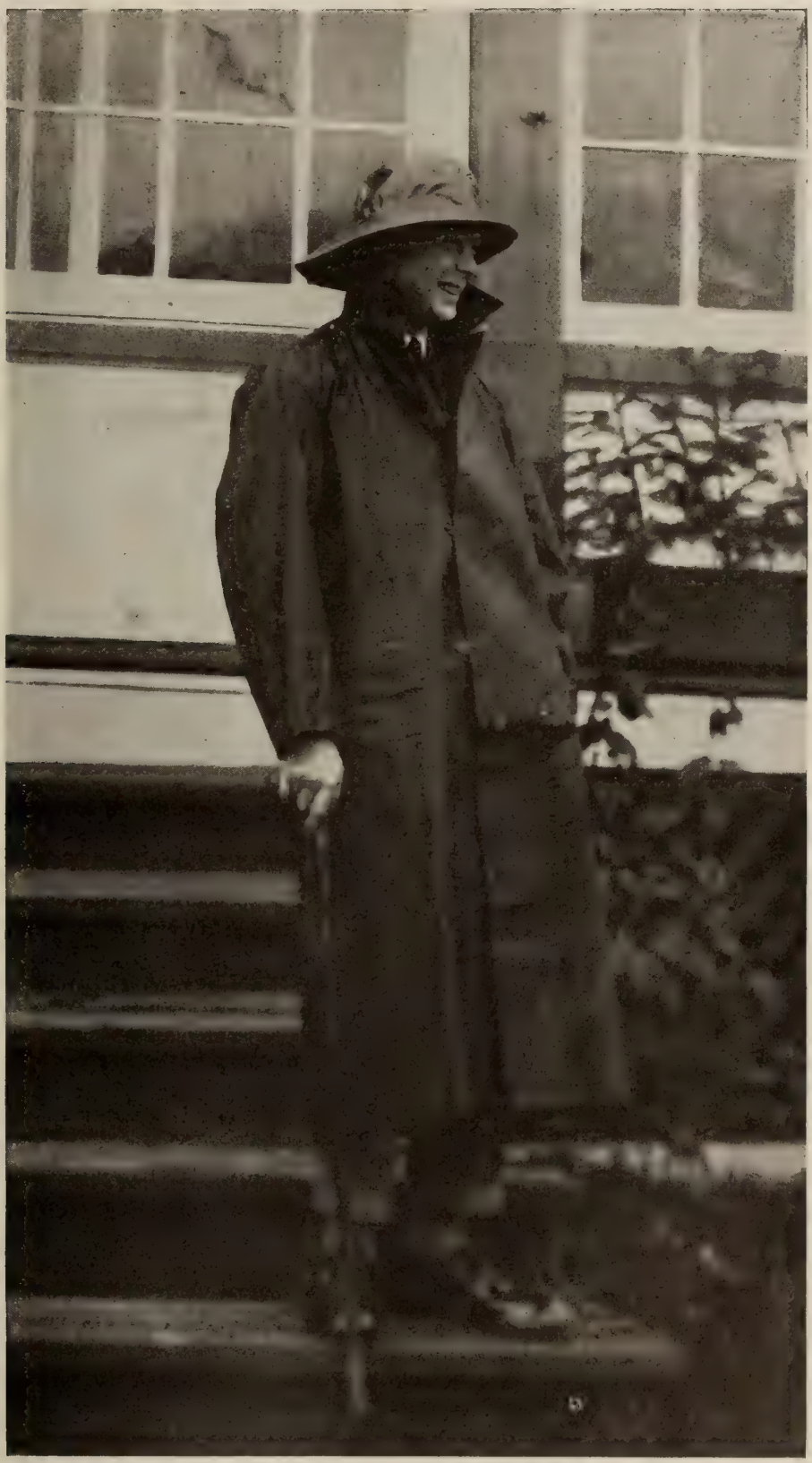


GENTLEMEN!—THE PRINCE.

:-: EDITORIAL :-:

The Meeting of the Canadian Mining Institute in Vancouver November 26, 27, 28, 1919

A meeting of the Canadian Mining Institute will be held in Vancouver during the concluding days of November. Dr. E. T. Hodge, Professor of Geology at the University of British Columbia, has been appointed General Secretary of this meeting, and all the news that reaches us from British Columbia indicates that a meeting is being organized which will be worth while travelling to attend.

The mineral production of British Columbia has attained the greatest value in the history of that Province. It is the second province of Canada in monetary value of mineral output, and in variety of product it leads all the provinces.

Signs are increasing that the immediate future of the mineral industry in British Columbia is exceedingly bright. The two western provinces which will be most interested in the Vancouver meeting include that part of Canada which contains the bulk of Canada's basic coal asset. The tremendous coal reserve of British Columbia and Alberta has such far-reaching implications that we would not dare to attempt to sketch them even in roughest outline. The possession of coal connotes both industrial and political power. It assures the future. It provides the most stable foundation on which to rear a national industry, a national culture, and national independence, always provided the people who occupy the land are virile and upstanding, and no person has ever questioned this characteristic of our western people.

More definite announcements regarding this meeting will be found in succeeding issues of the 'Journal,' which, needless to say, extends its heartiest good wishes for a large and successful meeting.

The Princess Colliery Tunnel

Mr. James Purves describes in this issue an unusual and interesting connecting survey which was successfully carried out under his direction in the Princess Colliery of the Nova Scotia Steel & Coal Company at Sydney Mines. It was the difficult conditions under which the work was carried out that will interest the practical surveyor, prominent among which was the constant movement of the strata caused by "creep." The connecting tunnel was driven through the waste, or, to use the phraseology of the north-country miner in England, the "gob was scoured" for a distance of 8,000 feet, the roof and pavement and the partly consolidated fallen rock lying in between being in constant but irregular movement. Long sights were infrequent, and it is mentioned that in one case nine settings of the instrument were required for 88 feet of distance. The work was subject to interference by workmen employed on the tunnel excavation, and many other distractions were the lot of the survey parties.

As a record of an unusual and difficult piece of work well done we believe Mr. Purves's account will have a practical interest to many of the readers of the 'Journal,' and we may further state that it was only upon our strong representations that the account should be published for the information of other mining men, that we prevailed upon Mr. Purves to write the description.

The Princess Colliery is in many respects an interesting place. Commenced by the General Mining Association in 1868, it was called the "New Winning," a name that has become almost humorously incongruous today. Mr. R. H. Brown, formerly Manager for the G.M.A., is authority for the statement that in this colliery in 1876 the first undersea coal in North America was won.

The Colliery is unique in another respect, inasmuch as the "Princess Deeps" are now extended seawards approximately 2¼ miles, and will require to be extended for a distance of approximately 3½ miles from the shaft bottom before they emerge from the leased area of the Dominion Coal Company and gain the outlying areas of the Scotia Company. Thus, the Princess Colliery has the longest undersea extension in America, and its plans contemplate the furthest seaward extension of coal extraction yet arranged for on this side the Atlantic.

The necessity for accuracy in the connecting survey to ensure a straight haulage-road arose from the far-reaching plans for future undersea mining, and with this also in view the Princess deeps have been driven of unusual width, with a view to passing large volumes of air. Similarly adequate provision for rapid long-distance haulage of coal is being made. In very many respects the Princess Colliery has no counterpart.

Britain's Debts Will Be Paid

A despatch from Atlantic City reads that at the International Trade Conference, which commenced there on the 20th October, the delegates were surprised when Sir J. H. Simpson, representing Great Britain, said that his country did not ask financial aid from any organization, but merely wished that no obstruction should be placed in the way of ordinary business.

Why should such a statement excite surprise?

Sir James correctly stated that no Government could stand in England which would contemplate for a moment any weakening in regard to the payments of the country's debts. "England," said Sir James, "is determined to pay her debts. England has always paid her debts, and will."

Brave words, and best of all, true words. The statement has two implications. Britain pays up, and she will see that other people do the same. The discharge of obligations in business, as in war, is an ingrained British habit.

Sir James further asserted: "The future of England is not dark. It is as bright as could be hoped for after making allowances for the war." There is one debt that Britain cannot repay, the debt she owes to those who died for her, but all other obligations will be liquidated in due course. Those who carelessly think that because Britain lost one million men in war, and emerges from the war with seven billion pounds national debt, she will fail in any particular, are wholly mistaken. The generation of Britons now passing into manhood, in four quarters of the globe, have passed five of the most impressionable years of life amid such fires of patriotism as come to full glow only in times of dire national emergency such as these five years were. This fact should not be lost sight of. There never was such a generation of youth in British history as that which will soon shape our policies, and, if they are not worthy of their fathers and mothers, they will be the first recreant generation in British history. That Britain is entering new ground is not to be denied. Old things are passed away and many things are become new, but in everything that makes for national strength the British peoples were never so remarkable as they are today. Our great traditions have been worthily sustained and notably added to, our national word and integrity cannot be impugned, we have emerged victorious from a war of Titans, desperately waged; our women were worthy of their men. The commonwealth of sister nations that, for want of a better term, we call the British Empire, may be financially poorer, but it is richer in everything else that matters, and, after all, there is no more goading spur to a proud and independent people than debt.

Our Northern Ontario Letter

The 'Journal has arranged for a weekly letter from its Northern Ontario correspondent, in which it is hoped to present all the important current news from the now numerous centres of mining activity in the North Country in a digested and convenient form. The sources of information from which our correspondent will prepare his weekly communication are correct and authoritative, and we have every reason to believe that in the future, as has been the case in the past, our Northern Ontario news will give our readers a correct impression of happenings and new discoveries in a district of Canada that annually becomes more impressive in its extent of mineral wealth and production. Our correspondent's weekly letter will be exclusive to the 'Journal,' and it is hoped will develop into a feature of this magazine, which while it will contain accurate news, will also be distinguished by the correct perspective which arises from continuity.

Matters deserving of more extended description and comment will not suffer by summarization, but where it appears desirable will be separately dealt with.

Misunderstandings between shift-bosses and the men under them are perennial. The following letter, written by an unhappy chuteman to the superintendent, was printed in the "Granby News," which states that as good chutemen were scarce the man was transferred to another shift-boss with satisfactory results:

"Dear Sir:—I very often heard from the Granby's employees say: that no man get along with B. Blank. Last Saturday night I found what I thought was exaggerate is perfectly true. I been worked for many bosses in this country and I noticed always that they could obtain as much and probably more work from their men without use any rough Language. We chutemen the trouble we have as: big muck, timbers, rails, pipes in the chutes headache from the powder, car off the track 10,000 compinations to get hurt. All this trouble is not enough for the money we get but we got to listen the educationless shift boss's bad words "as side dish." For the second time B. Blank offended me last Saturday night without any reason, but just because I'm Italian and also he had the mouth to talk with not because he had any brains. I told the motorman to report me off yesterday I don't like give any more chance to get me in trouble. I soon lose money than my liberty. I thank you for your valuable time you spent to read my important communication and pardon me to not call at your office personally because I think I can explain myself better in writing and this will cause less disturb too."

The Princess Colliery Tunnel, Sydney Mines, N. S.

An Unusual Connecting Survey, Made Through an Undersea Colliery Waste, Affected by Creep

By JAMES PURVES,
Engineer, Nova Scotia Steel & Coal Co.

In presenting the following, there is no idea of giving to those, who may deem it worth while reading this article, any new or original ideas. Nor is it intended to infer that anything out of the ordinary was achieved. It may, however, be interesting to some, inasmuch as it is evident that, considering conditions under which the survey was made, and the many opportunities afforded for personal errors to creep in because of difficult instrument positions and long tiring periods of work, that undoubted errors of comparative minor importance, evidently in the long run offset each other to such an extent, that results were remarkably good.

In "Princess" Colliery or "New Winning" as it was known, operated by the General Mining Association from 1868 to 1901, and since by the Nova Scotia Steel & Coal Co., the submarine areas were practically mined out in 1913 to surrounding areas held by Dominion Coal Co.

The Nova Scotia Steel & Coal Co. had acquired areas beyond the Dominion Coal Co. at a distance of two miles further out to sea. In order to win these areas it is necessary to go through the Dominion Coal Company's territory; and two square miles were acquired by lease for this purpose from the Dominion Coal Co.

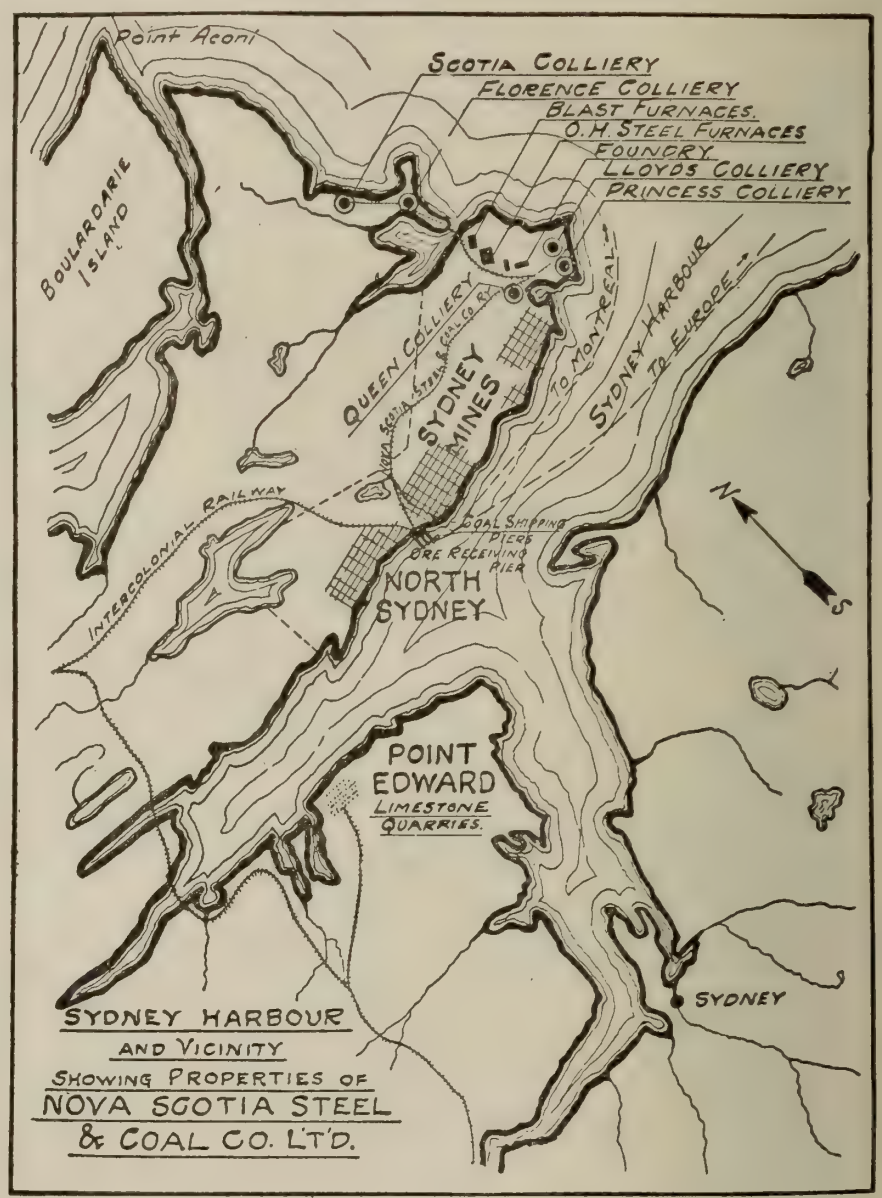
The relative location of these two square miles of what might be termed connecting leases; to the main hoisting shaft at Princess Colliery, fixed rigidly the direction in which deeps had to be driven in order to ultimately handle coal efficiently over a route which will be from four to five miles long, probably longer . It will be readily seen that this main outlet for the Colliery output had to be straight or rather it was admitted that if straight, haulage problems would be made easier and operating, generally facilitated for all time. In order to bring this new coal to the pit bottom on a straight road, it was necessary to tunnel through the old workings a distance of about 8,000 ft. Many of the districts in the old workings through which the tunnel would pass, had pillars drawn, and of course was all down. Most of the old rooms and pillar workings were also in a fallen state.

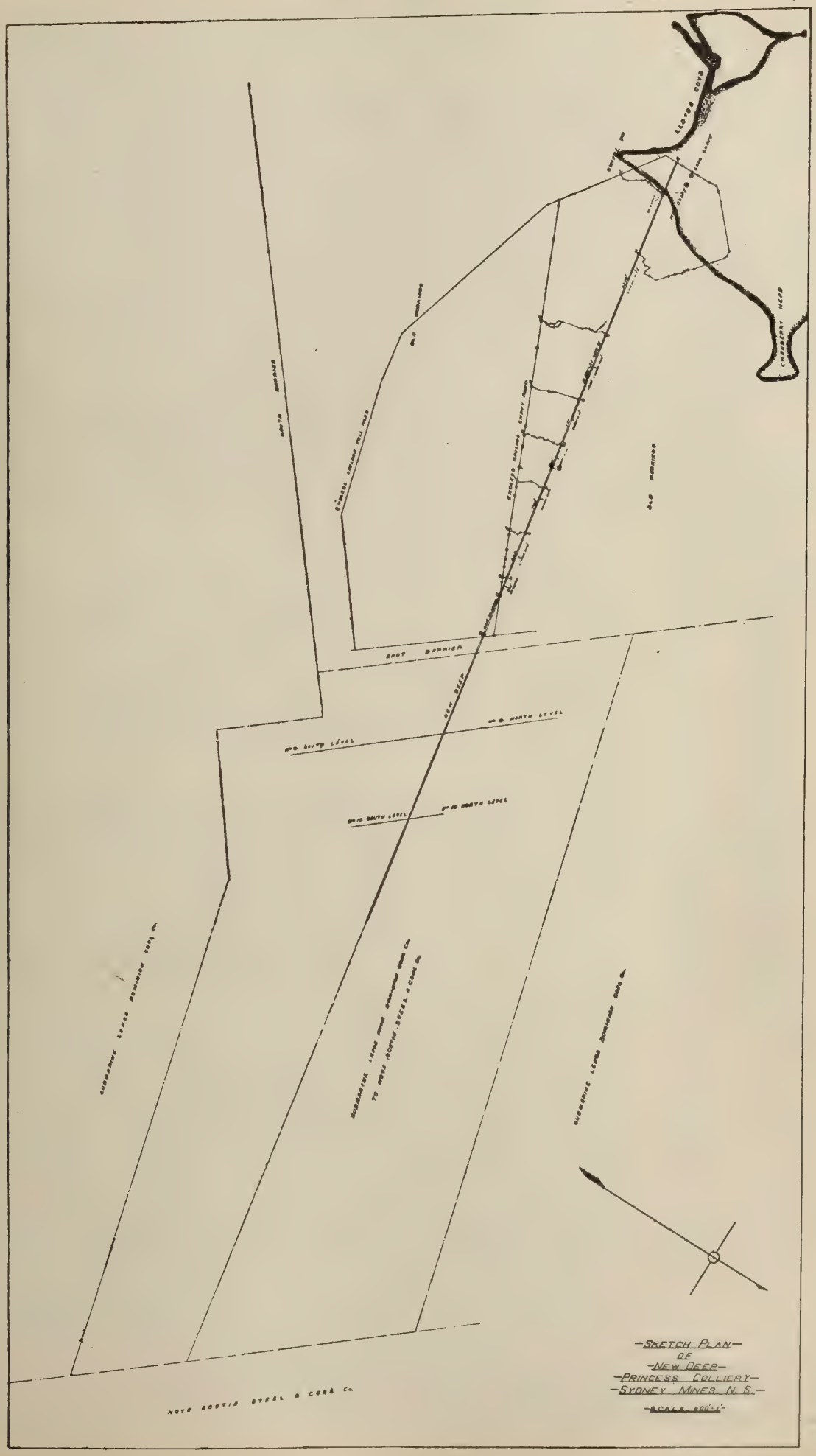
The chief difficulty presenting itself to all in tunneling through these old workings was to find a place to stow the debris, and from the first it was remarkable how little open space was found available. Therefore, apart from the time that would be required to complete this work from a fewer number of openings it was necessary to get as many faces going as possible, with the hope of finding suitable stowing room.

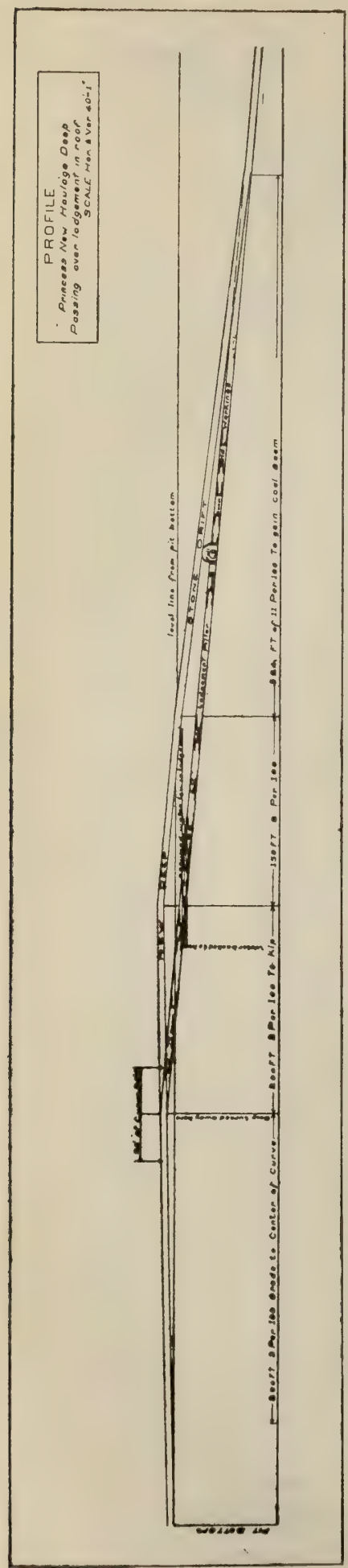
To this end, old levels were ribbed in at eight different points along the old haulage way. The positions chosen for ribbing in to the locus of the proposed deep just about approximately divided the overall distance.

The accompanying sketch illustrates what the writer has been trying to explain.

Mention has been made of difficulties in making the survey, or rather difficulties that appealed at the time. Some of them may be mentioned; for instance: Some districts were undergoing a "creep." If not undergoing creep at the time, creep was possibly brought on or




-SKETCH PLAN-
OF
-NEW DEEP-
-PRINCESS COLLIERY-
-SYDNEY MINES, N. S.-
-SCALE 100'-1"-



accelerated by the ribbing in of old workings in order to find a place of beginning. As a consequence all marks in these districts were constantly shifting their position. In many places, check surveys proved angles to read differently at all times and as much as two minutes of arc in a distance of 50 feet was noted over a period of 48 hours Every time the instrument was taken into these districts for purposes of alignment, it necessitated a re-survey from some point known to be dependable. These places, cleaned out or ribbed, for no other purpose than to get in with an instrument were not always boulevards, nor were they any higher than necessary to say the least, and with all had to be timbered. Furthermore, the line of least resistance was invariably followed, and as an average length of sight in one case to locus of deep was 88 ft. for nine settings of the instrument, it can be well imagined that the instrument was squeezed into many difficult positions in order to get as long a range as possible or even to get along at all. The work of worrying into the old gob with pick and shovel, horse and tram, in order to find position, was prosecuted day and night, and the transit was there at all times, but the survey could not hold up the work for long; the annoyances encountered can be left to the imagination. Morals suffered extremely.

There is a gentleman of the writer's acquaintance working for a sister corporation to the south, who could have done justice to the occasion, but while his remarks would have been literature, the same remarks would possibly not have been interesting to a publisher.* (See p. 794, Journal, Oct. 15.—Ed.)

Taking it all through, there was every reason to fear that in spite of every care, errors would be bound to creep in sufficiently serious to put alignment badly out, and necessitate a widening of the tunnel on one side or the other, in places, to permit a readjustment of centre line, and indeed until all connections were made this nightmare was ever present.

Referring to accompanying sketch, the survey was begun at pit bottom on April 25th, 1913, after previous plumbing the shaft, and tying up the shaft plugs with No. 1 monument at General Office. (This monument is tied up with all Company lease corners.) The survey was carried down the empty rope side of the endless haulage system, a distance of 8,944 feet to a point at the barrier previously established on the new proposed deep centre line. This point and a point fixed 300 ft. south of the pit bottom were the objectives to be lined up, and the production of a line through these points would reach the outside submarine areas of the Company at a desired position and at the same time pass through the leased areas in such a direction as to give a two-sided pit all through.

This survey was checked back from barrier to pit bottom over the same route, but on different points; all horizontal angles were redoubled and vertical angles read to minutes. All measurements were made on the plane of the coal, and afterwards reduced to horizontal measurement. This survey was considered a base survey and checked over very carefully. The conditions under which this part of the work was done were comparatively good. The Haulage Deep was straight for long distances, the average cross section of the roadway throughout being about 10 ft. wide by 5 ft. high, giving a fair opportunity to see over, or by coal tubs. These tubs were left on the rope during the survey which was made at night rather than disarrange the operations of the colliery the following day.

Small brass hooks were used for stations, these hooks being screwed into plugs drilled for and driven into the rock roof. From these hooks the plumb bob was flung on a fine line. By holding the white reflector of a Hirsch electric lamp behind this line, it was clearly visible and distinct at 500 feet.

Care was exercised in holding the bulb of the lamp directly in line behind the string for sights longer than 500 ft. or at points so distant that the string was not visible. On the satisfactory completion of this survey, the latitudes and departures of the objective points A and B were calculated and the direction of the closure established and turned off at A and B.

At B the work was begun up and down. It might be interesting to say that at A the tunnel had to be thrown up into the rock roof in order to pass over the main water lodgement at the pit bottom, dipping again as shown on accompanying profile to meet the coal at a point 1,016 ft from A.

After work at A and B was begun, the position on the endless haulage deep where the new centre line crossed as shown marked C was established by calculation and work was begun at this point up and down.

Points on the Base Survey were then chosen at D, E, F, G, H, I, and J, and a start. made to clear, through old workings, a way for survey, into the locus of the new deep centre line. The rough distance these places had to be driven was scaled and when nearing the centre line, calculation for true position was

Stations	Deflection Angle R. or L.	Magnetic Bearing	Calculated Bearing	Vertical Angle	Slope Distance in feet	Horizont. Distance in feet	Latitude	Departure	TOTALS N	TOTALS S	TOTALS E	TOTALS W	Station
H. - Pu.	Base line		S 86° 49' W										Pu.
Pu - N°1	L 92-47'		S 5°-83 E.	—	192·20	192·20				85·90	4127 15		N°. 1
N°1-300	L 3°-31		S 9°-29 E.	—	106·90	106·90				192·69	4132·15		300
300-N°2	R 3°-24		S 6°-05 E.	—	123·37	123·37	122 67	13·07		315·36	4145 22		N° 2
2 - 3	L 23°-55		S 30°-00 E	1°-38'	103·80	103·75	89·85	51·87		405·20	4197·09		3
3 - 4	L 24°-43'		S 54°-43' E	2°-27'	1766·70	1764·93	1019·46	1440·71		1424·65	5637·80		4
4 - 5	L 53°-4-30		N 72°-12'-30" E	3°-30'	69·50	69·36	21·19	66·04		1403 46	5703·84		5
5 - 6	L 5°-7		N 67°-5'-30" E	4°-00'	533·35	531·96	207 07	490·00		1196·39	6193·84		6
6 - 7	No Angle		N 67°-5'-30" E	4°-38'	1244·5	1240 89	483 02	1143 02		713 36	7336·86		7

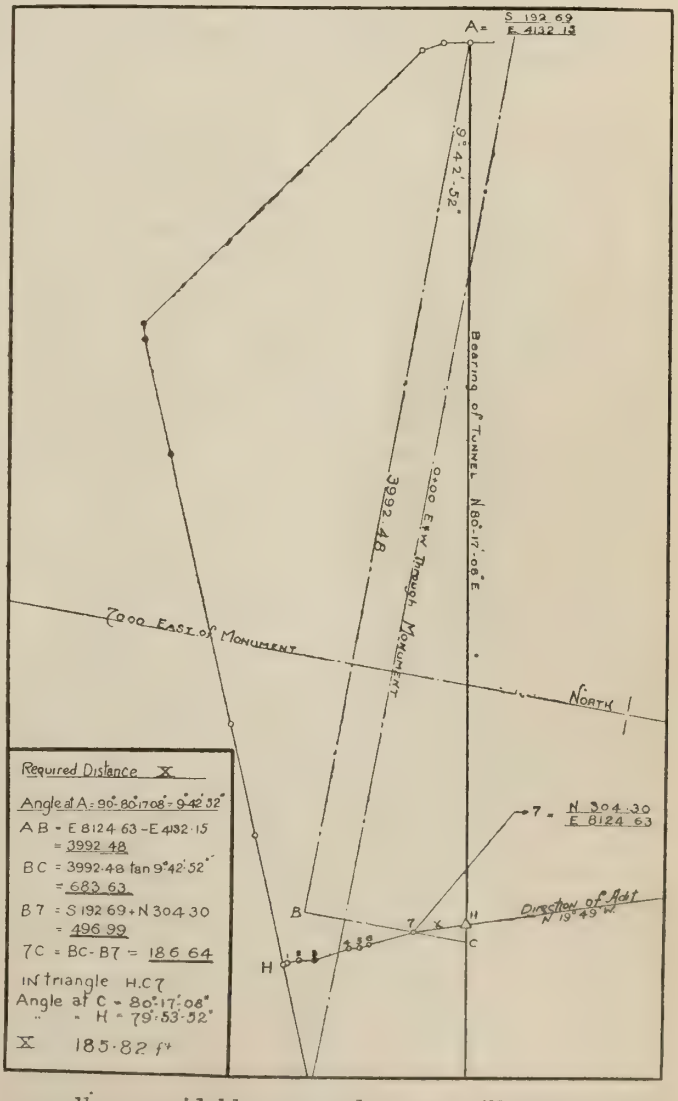
Sample page from Note Book.

made by fixing a direction along the line of adit and solving the triangle for distance along the adit in the fixed direction, for the point of intersection with the tunnel centre line. Possibly the establishing of these intersection points warrants the accompanying illustrative diagram.

In addition to the intersections fixed for intermediate working points, a tedious survey was made across to the old north side and in an old angle deep below the lodgement, to an intersection with new centre line. This deep was partially standing and advantage was taken of this to carry a survey in here for the purpose of intercepting the closure between points I and J, and thus proving the correctness of the work that would be done up to this point. It is interesting to note that the centre line ultimately passed 1¼ inches north of this point—marked K on the accompany plan. It may be noted here that the position J as found was in the old workings in the coal. The tunnel overhead at this point about 12 feet; in process of dropping to meet the coal. When J on centre line was found, the roof was blown down until the grade of the tunnel was reached, and the work prosecuted up and down as before.

The position at which each place broke through is indicated on the accompanying plan and also the amount of error in alignment. It is to be noted that the greatest error in alignment occurred between points only 700 ft. distant one from the other, and, that almost perfect checks were made at other connecting points much further apart. The most satisfactory connection made being between the points furthest apart, in other words, between I and J a distance of 2,300 feet, where the established centre line in each place met on a plug 3" in diameter, the error being about 2½ inches.

While it is evident that the number of places worked and consequent cutting down of distances to the various points of connection kept possible errors within reasonable bounds yet the smallness of these errors was a source of satisfaction and congratulation, and indicated as stated at first, that an important survey may be undertaken with ordinary field equipment, and in the over all, unavoidable personal errors will more or less eliminate themselves in the end. The instruments used were Gurly Light Mountain Transits, tried daily for adjustments of colimation and level.


A = S 192 69 E 4132 15
9°-42'-52"
Bearing of Tunnel N 80°-17'-08" E
3992.48
7000 E. & W. through Monument
7000 East of Monument
North
7 = N 304·30 E 8124·63
Direction of Adit N 19°-49 W
B
H
C
Required Distance X
Angle at A = 90°-80°17'08" - 9°42'52"
A B = E 8124·63 - E 4132·15 = 3992·48
B C = 3992·48 tan 9°42'52" = 685·63
B 7 = S 192 69 + N 304·30 = 496 99
7 C = BC - B7 = 186 64
In triangle H.C.7
Angle at C = 80°17'08"
" " H = 79°53'52"
X 185·82 ft

Some Elements of Economy in Air Compression

By WM. CARTER, A.M., A.S.M.E.

Second only to electricity in the extent and diversity of application, compressed air is one of the most important agents in every phase of the development of civilization. In the arts, sciences and manufactures, its use has wrought economies which could otherwise never have been realized. Compressed air appliances have exercised an influence upon improved standards of living, second to no other means of power transmission and application. Wherever properly applied, they have brought about economic results which are reflected in every field of activity. But the efficient application of compressed air presupposes an efficient source of compressed air. The most economical devices cannot work to advantage under a high cost of power.

The cost of compressed air for whatever purpose or however produced, involves three separate items: —first, interest and depreciation on the investment for compressing equipment; second, cost of operation; third, cost of maintenance or up-keep. Extravagance in any-one, will offset savings in the other two. Compressed air can be had at minimum cost only when each of these three items is minimized. All three depend fundamentally upon the design and construction of the air compressor.

An air compressor is a machine for transforming energy from one form to another and is to be considered as promarily made up of three parts, namely, the driving element, the compressing element, and the mechanical structure, combining these two which may be designated as the power transmitting element. It is not always possible to draw the line sharply between these several elements, but the subdivision can be made with more or less exactness.

In the transformation of energy there is a certain loss. The measure of efficiency of an air compressor is the ratio of the horse power applied as initial energy to the horse power represented delivered. The inevitable losses in air compression may be broadly classed under five headings, as follows:

The first loss is that due to friction in the mechanical structure which transmits the power from the driving to the compressing element. The second loss is that arising from the heating of the air during admission to the cylinder, resulting in a reduction of its density and a diminished volumetric efficiency of the cylinder. The third loss arises from the heating produced by compression and its effect upon the air during compression, calling for more power. The fourth loss comes from the reduced volumetric efficiency of the cylinder due to the fact that the intake air is seldom at atmospheric pressure owing to friction in the inlet valves and passages. The fifth loss is also one of volumetric efficiency due to the effect of the clearance air in reducing the effective length of the admission stroke.

These various losses can be kept down to the minimum by correct design, and construction, but they can never be entirely eliminated. It is not possible even to give average percentages for any one of these losses, which may occur in different combinations, depending upon the mechanical details, the general type, the speed and the capacity of the compressor. After all these losses have been deducted the net efficiency of the machine remains, and of this Mr. Frank Richards says, "It is safe to say that the ultimate efficiency never goes as high as 80 per cent, while it often goes below 60 per cent.

Taking up now in order the three primary parts into which the compressor has been divided, the driving element comes first for consideration. Air compressors can be broadly defined as either steam driven or power driven.

The ordinary steam driven compressor is simply a steam engine with one or more air cylinders directly coupled on an extended piston rod. With this understanding it will be unnecessary here to enter into any detailed consideration of the design of the steam end. What constitutes good steam engine practice is the best compressor practice so far as the steam end of the compressor is concerned.

However, there is one vital distinction between steam engine and compressor practice. The steam engine for ordinary power purposes must maintain a constant speed irrespective of load. The steam driven air compressor, on the contrary, in order to maintain its output of air properly adjusted to its load, must run at a variable speed, for its piston displacement or its capacity is directly proportional to its speed. This means that while the steam engine has a variable load per stroke, the air compressor has a constant load per stroke, except for the small discrepancy due to varying friction and compression efficiency at varying speeds.

This feature has no particular bearing upon the performance of air compressors with simple steam cylinders, but it has a most important bearing upon the application of compounded steam cylinders to compression work. The first essential of successful steam compounding is in maintaining the proper ratio of expansion. This means that for a given steam pressure, for a given back pressure and for a given cylinder ratio, there is one and only one proper point of cut-off for both steam cylinders.

In any given case the first and third conditions must be considered constant, leaving the second condition as the variable which is to be adjusted to meet varying conditions. Where a constant speed must be maintained regardless of load this must be accomplished by change of cut-off; and in compounded steam cylinders this immediately destroys the proper ratios of compression and sacrifices economy. Constant speed practice with compound engines must be a compromise even at the best.

But in the air compressor, where the load per stroke is constant, the cut-off on the steam cylinders remains practically constant and the correct ratio of expansion is maintained over the full load range. The word "practically" is here used advisedly since there is bound to be a very slight departure from perfect conditions to produce the necessary change of speed under varying load. But it will be evident that the air compressor offers the ideal opportunity for securing in highest degree the advantages of steam compounding.

It would appear proper that in steam driven air compressors the first element of economy lies in using compounded steam cylinders, operating under press-

ure which will make the saving worth while. The peculiar operating conditions of the air compressor, just explained, justify compounded steam ends under pressures lower than would be advisable in ordinary engine practice. The largest builders of air compresors are recommending compound steam ends for as low as 80 pounds boiler pressure running condensing, and for 100 lbs. running non-condensing.

The three fundamental advantages of compounded steam cylinders on air compressors may be summarized as follows: Lower fuel consumption and fuel cost, lower cost of boiler feed water, lower cost of boiler plant and accessories.

Turning now to the subject of power driven compressors, they are in general an evolution from steam driven types. They differ, however, from the others in the vital fact that while steam driven compressors are variable speed machines, power-driven compressors are in the vast majority of cases constant speed machines. This makes the problem of regulation quite distinct in the two cases. This point will be taken up more fully later on.

Discussing now the various methods of drive, belt drive is the most common and is always applicable except where a very short center is necessary. In such cases, so high a belt tension is required, that an undue pressure on shaft bearings is produced, manifesting itself in excessive friction, low mechanical efficiency and rapid wear of the bearings. A good rule to follow is that the belt centres should never be less than three or four times the diameter of the larger pulley, and the direction of belt motion should be such as to put the slack on top. Where ample belt center cannot be had, it is much better to go to some other form of drive.

Rope drive is perhaps the next choice, although it is seldom used where the power to be transmitted is small. It is particularly advantageous where short centers only can be had, as the grip of the rope in the grooves gives the necessary pulling power without undue tension and bearing friction. The durability and efficiency of the rope drive depend entirely upon the shape of the rope grooves and upon the use of a suitable number of ropes so that no one rope is under excessive strain.

The use of tighteners, whether for belt or rope is always to be avoided. There may be cases where there is no alternative, but probably were the facts known, they have cost far more than they are worth in the increased repairs and larger power consumption. A recent development by one of the larger builders however, opens up large possibilities for belt drive on close centers without any increased friction. This arrangement involves the use of a floating idler pulley and a very slack belt. The weight of the idler takes up the slack of the belt and increases the arc of contact on the driving and driven pulleys so that the full power is transmitted without any undue strain on the bearings or on the belt itself.

Gear drive and silent chain drive are never desirable and should be used only where the demand for compactness renders them imperative. The best practice places the limit of power for gear drive with a raw hide pinion at 40 H.P..; for gear drive with a steel pinion at 60 H.P.; and for silent chain or herringbone gear drive at 50 H.P.

A very modern development is the direct-connected electric driven air compressor with the rotor of a slow speed motor mounted directly on the compressor shaft. This construction is not applicable to smaller units because commercial conditions limit the price to be paid for a motor and slow speed motor of small power, costs out of all proportion. On moderate and large sized machines, however, this design affords the very highest possible economy in power driven compressors. Recent improvements in air valve movements and in air cylinders design which permit much higher piston speeds than ever before were considered practical, have contributed toward the success of the direct-connected compressor unit of this design. Unless the valve and port areas are very large, the compression efficiency is so greatly reduced at the customary speeds as to off-set the advantages of compactness. The choice of a direct-connected motor driven air compressor therefore, should be determined by an investigation as to whether the compressor had been specially designed for this method of drive or whether it was simply a standard power driven machine specially fitted with a motor. In the latter case, satisfactory results cannot be expected.

The same general remarks apply to the directed-connected water wheel compressor. But as this style of drive is comparatively rare and can be used only where the head and volume of water are exactly right, this condition is not likely to come within the experience of the average engineer.

The problems encountered in a steam cylinder of an air compressor are problems of expansion. Coming now to a discussion of the second element in the air compressor—the compressing element—we find here that the problems are those of compression almost an exact reverse of those in the steam end. In compressing air all of the energy applied is converted into heat. At first glance, therefore, economical consideration consideration would seem to indicate that this heat should be retained during compression. As a matter of fact, however, economical air compression depends primarily upon the thoroughness with which the heat of compression is removed as fast as it is produced. Compressor practice uses one or both of two methods for accomplishing this, namely, water jacketing, and compounding or stage compression.

If the piston of a compressing cylinder could move so slowly that the water in the jacket could absorb and carry off all the heat, it is evident that this jacketing process would save all the work which is represented on the indicator diagram by the areas between the actual compression line and the isothermal curve. But in actual practice a compressor cannot be run so slowly and water jacketing is only a partial solution of the cooling problem.

Temperatures increase with the pressure in the cylinder and it is evident that the advancing piston steadily reduces the effective area of jacket. Near the end of the stroke, when pressure and temperature are highest, very little of the cylinder wall is exposed and the greater part of the cooling area remaining is the cylinder head. This emphasizes the importance of head jacketing and the superiority of those constructions in which the air valves are not in the heads, thus affording the largest percentage of cool head areas.

(To be Continued.)

Special Correspondence

BRITISH COLUMBIA.

Princeton, B. C.

An outline of what has been done and what is planned by the Canada Copper Company in the development of the Copper Mountain low grade, but exceedingly large, deposits was given recently by H. R. Van Wagenen, general manager of the company, before representatives of the Board of Trade of Vancouver and Princeton. The former were finishing a trip through Okanagan and Similkameen Districts of the Province and were being entertained by the latter when Mr. Van Wagenen gave the very interesting talk in question.

Describing the ore of the Company's new property as being not dissimilar to that of the Hidden Creek Mine, Anyox, and of the Britannia Mine, Howe Sound, B. C., Mr. Van Wagenen said that all the plant and equipment essential in the economical treatment of such low grade ore had been provided. A spur railway had been constructed connecting the Mine with the Kettle Valley Railway Co. and the West Kootenay Power and Light Co. was to put in a line for the transmission of power for operation. Labor conditions had interfered with the former work but it now was well underway and as soon as completed the recovery of ore would be started. The power line came in over 105 miles from Greenwood and 165 miles from Bonnington Falls, the source of the power. The necessary equipment was on hand for the Mill to be operated at Allenby. The site of this plant was 5.5 miles from the town of Princeton and 7.7 miles from the mine. Mill construction would mean an investment of about $1,000,000 and the installation would permit the handling of 2,000 tons of ore a day. Units were prepared in such a manner that a daily treatment of 5,000 tons could be arranged for with little additional expense. Already the Company, in preparation for the opening and the placing of its mine on a productive basis, had spent some $2,500,000, and there was no doubt that the aggregate investment, before all work was complete, would run to $3,500,000. With the outlay of the Kettle Valley Ry. Co. and that of the West Kootenay Power and Light Co., the enterprise, when it was in shape to commence making returns, would aggregate somewhere in the neighborhood of $6,000,000.

At the mine employment would be found for between 400 and 450 men. These, with their families, for whom houses are to be built, would constitute a new town of about 700 people. At Allenby the Mill would require 100 to 150 men. As a rule mill men stayed steadily in one place, settling down with their families, so that it might be expected that this would mean another town of some 400 inhabitants.

Copper products, at the present market, would amount to about $18,000 a day. There was a tonnage of 10,000,000 in sight, with an additional 2,000,000 semi-proved, added to which there would be ore at depth. The ore could be dealt with on the gravity system as the tracks and tunnels were below the lowest known ore. This ore would be run down to the Mill and the resultant product probably would be sent to the Trail Smeltery of the Consolidated Mining and Smelting Company.

Trail, B. C.

An appeal was argued recently before the Supreme Court of Canada which is of interest to the mining men of this Province, the principals between the Consolidated Mining and Smelting Company of Canada and Endersy, a farmer in the Trail Smelter District. This is an action brought by the latter against the Company for damages claimed to have been done to his farm, crops and timber by the metallurgical smoke from the Trail Smelter. The case originally was tried before a special jury which found for the plaintiff, the verdict awarding the latter $2,170. The Company appealed to the British Columbia Court of Appeal which upheld the judgment of the lower court. The case then was carried to the highest Canadian court with the same result, the appeal being dismissed with costs.

Ore receipts in gross tons at the Trail Smelter of the Consolidated Mining and Smelting Company, from October 8 to October 14 incl., were 4,148, making the total for the year 266,543 tons. This marked decline is attributable to the strike of metalliferous miners at Kimberley, B. C. The Sullivan Mines, owned by the Company, made no production during the week because of this walk out and there is no indication as yet of a settlement of the trouble as the management refuse to negotiate with the men while they act as an organization affiliated with the One Big Union. On their part the men, hitherto, have refused to repudiate the O. B. U. The Centre Star Mine, Rossland, B. C., another Company property, continues, therefore, to be the banner shipper, having 1729 tons to its credit over the period in question. Of the independent shippers the Black Bear, Rossland, stands highest with 574 tons while the Josie, also of Rossland, which is working steadily, sent 442 tons to the smelter. Other shippers are the Lone Pine, Republic Wn., with 169 tons; the Mandy, Le Pas, Manitoba, with 298 tons; the Quilp, Republic Wn., with 270 tons; the Ruth Cedar Creek, 100 tons; the Alamo, 47 tons; and the Iron Mask, Kamloops, 44 tons.

Nelson, B. C.

The second Relief Mine, one of the promising lode properties of the Erie Camp, B. C., suffered seriously from fire in July, a forest conflagration sweeping over the property and destroying buildings and much of the equipment. A. D. Westby, manager of the Relief Mining Company, who was in Wisconsin, at the time of the fire, has returned and announces that the work of re-building will be started as soon as negotiations for the capital necessary, the success of which is said to be secured, are complete. It is proposed not only replacing what is lost but making the plant more modern. The Relief Mining Company paid $300,000 for the property which has produced in the aggregate some $650,000. Of this mine the Minister of Mines report for 1918 says that the ore is gold-bearing quartz, the gold being recovered by amalgamation and concentration. During that year eighty-five tons of concentrates were shipped to Greenwood Smelter from 1,241 tons of ore treated at the mine. Development work consists of 50 feet blind drift and stoping.

Ainsworth, B. C.

The Colorado Mine in the Whitewater, B. C. has been bonded by Wm. Martin and G. R. Crowe, two financiers of Winnipeg, Man., and the deal is expected to lead to the consolidation of this property with the

old Charleston group, consisting of the Charleston, Keystone and Kingston claims. In 1897 the latter were among the most important properties of the District and with the additional ground will be one of the strongest mineralized areas of the Slocan under development. The Charleston was quite a heavy shipper in 1896-98 but operations ceased because of the low price of silver and since that time only a limited amount of work has been done. A. J. Harris, who has been on the ground under lease, finally was able to show that with the Colorado the Charleston properties promised to become well worth while and that they certainly merited opening up on a considerable scale. The Colorado adjoins the Whitewater and lies between it and the original Charleston group. This summer a crosscut tunnel was started on the Irene, one of the Whitewater claims, for the purpose of tapping an ore body on the Colorado. The tunnel will be continued this winter. For the present only a small crew will be employed but financial arrangements already have been made for purchasing machinery necessary to permit much more extensive operations next spring.

Victoria, B. C.

Hon. Wm. Sloan and other representative mining men of British Columbia have been invited to attend the second international mining convention of the Pacific Northwest which is to be held at Seattle, Wn., from March 10th to 13th next. Glenville A. Collins has been appointed permanent Convention Chairman and Moncrieffe Cameron is the permanent secretary, both being residents of Seattle. Arrangements already are underway for the assembling of what it is hoped to take the largest and most representative mineral display ever shown on the Pacific Coast. The first International Convention, it will be recalled, took place last year at Vancouver, B. C.

The announcement that Hon. Wm. Sloan, Minister of Mines, propose taking a stand with respect to holders of placer leases in British Columbia who have failed to work the same and moreover have got behind in their rental payments has been received with expressions of approval from the general mining fraternity of the Province as well as from certain mine journals of the Northwest. It is felt, evidently, that the time has come for action of the kind, there being many in the position indicated with the result that considerable placer areas in promising districts are held, without return to the country or to the administration. If the lease holders were required to meet back payments by a specified date or to relinquish their rights there is no doubt that much placer ground at present dormant would be taken up and made to produce.

Change in Management of Premier Gold Mining Co., British Columbia.

A substantial interest in the Premier Gold Mining Company, Limited, which owns the Premier Mine, Salmon River, B. C., Canada, has been purchased by New York interests, and the management will from now on be in the hands of the American Smelting and Refining Company.

The new officers and directors of the Premier Gold Mining Company are as follows:—

President, R. W. Wood, Fernie, B.C. Canada; Vice-President and Managing Director, H. A. Guess, 120 Broadway, New York City; Vice-President, Minor C. Keith, 17 Battery Place, New York City; Secretary, W. E. Merriss, 120 Broadway, New York City; Treasurer, L. A. Chapin, 120 Broadway, New York City.

The Directors are: R. W. Wood, R. K. Neill, W. R. Wilson, H. B. Price, M. C. Keith, W. C. Potter, H. A. Guess.

Mr. R. K. Neill continues as Manager of the company.

Aftermath of Poisoning at Hunker. Widows Awarded by Yukon Gold Company.

The Yukon Gold Company has paid $2,500 to the widows of four of their employees who died from poisoning last May. After a noon meal at the Hunker Company's boarding house at Hunker many of the men become seriously ill and twelve of them died. Another widow whose husband was not employed by the Company but who was boarding at the Company's mess has been paid $1,000.

It was not clear whether this case came under the Workman's Compensation Act or not but the matter was satisfactorily adjusted on the Company's making the payment which it did. Manager McCarthy who handled the matter was fair and impartial and stated that he would have been pleased if the way could have been clear to allow even more for the woman who suffered such a great loss.

The men who were taken sick and recovered have been allowed half time by the company for all working time lost and the hospital expense for each victim was borne by the physicians having the medical contract to take care of any patients taken ill while in the employ of the company. The physicians are compensated by a medical fee deducted monthly from wages of the men.

Kirkman Creek Proving Successful.

J. T. Cooley, old time Yukon miner, gives a good report on Kirkman Creek in the Yukon district. He says that the twelve men who have been busy there this season have made good and are facing the winter comfortably fixed. It is expected that a number of others will aid to the Kirkman colony this winter.

Many of the claims which have been staked on the creek have not been prospected and there many others which could be staked. The ground needs prospecting and could handle about 100 prospectors with fair promises that it will all be as good as the ground now producing. Mr. Cooley recommends Kirkman Creek to any prospector looking for something that will leave him at the end of the winter with something to the good.

Silver Strike Babine Lake District.

A total of $1,100 per ton is a pretty fair showing. The following assay is from specimens of galena taken by Arthur Wood from his Silver Fox Group between Babine and Taltapin Lakes, and brought to the Vancouver Chamber of Mines: over 930 oz. of silver, over 1 oz. of gold, nearly 5 per cent copper, and 20 per cent lead. This was taken from a 4 ft. lead.

Mr. Wood has returned with a force of men to operate the property. It is understood that several well known local men are interested with Mr. Wood.

Our Northern Ontario Letter

A number of prospectors have left Cobalt for the scene of the recent discovery of radium-bearing ore in the township of Butt in the district of Nipissing. One party just returned from that district, declares that it appears to hold out fair promise of being an active field, in view of the find being a promising one and on account of the world-wide interest being taken in radium and its tremendous value.

Producing at the rate of upwards of $40,000 every twenty-four hours, and fully manned with efficient workmen, the mines of Cobalt are deriving the maximum benefit from the current high quotations for commercial bar silver. That a prosperous future still lies before the mines of Cobalt is borne out in the fact that a large part of the total output continues to come from high grade ore. At the Nipissing, large deposits of high grade ore are being constantly drawn from, while at the O'Brien a large quantity of ore is in sight which contains close to $5,000 to the ton. At the Mining Corporation a substantial part of the total production comes from high grade ore, while at the Kerr Lake some two-thirds of the total ore reserve is made up of high grade ore. Added to this comes official reports from the Beaver Consolidated that a vein now being opened up is being found to contain considerable ore that contains around 4,000 ounces to the ton. The Coniagas Company will end its fiscal year on October 31st with a production unofficially estimated at upwards of $800,000. Of this, it is learned in usually well informed quarters about two thirds may be found to be net profit, and at least indicates a fair surplus over dividend requirements of 2½ per cent annually, or some $400,000. On October 25th the company disburse a 2½ per cent dividend, the fourth to be paid this year. This brings total disbursements up to $9,640,000 since 1907.

Rumors persists to the effect that the Temiskaming Mining Company may reasonably resume dividend disbursements in the near future. This belief is supported by the fact that the latest report of the company showed a surplus of some $922,000. Added to this is an official statement made to your correspondent that the company has operated during the current fiscal year at a profit. This would tend to indicate that the surplus may be nearing the million dollar mark and that dividend disbursements are justified. On the Gans lot, according to official advice, some rich patches of ore are being encountered. Master in Ordinary Roche, at Osgoode, Toronto, has signed the formal legal order directing the liquidators of the Bailey-Cobalt Mines to proceed immediately to transfer the Bailey Mine and its assets on the terms of the offer made by A. J. Young.

It is said that the papers for the incorporation of the new company which is to be known as the Bailey-Northern Customs, Limited, are already being prepared and that the transfer should be completed in time for the new company to commence operations on the Bailey before the end of November, or at least as soon as the legal details are properly carried out.

Under the terms of the offer which the Court has accepted, the present Bailey shareholders will receive one share of stock in the new company for each ten shares of their present stock. The capitalization of the new company will be $1,250,000 with $50,000 in the treasury. This treasury insures the shareholders that the property can be actively operated, and the property soon placed on a producing basis.

The Tretheway-Cobalt is reported to be seeking financial aid in carrying out the development of the Castle property in the Gowganda district. The Trethewey has an option on 51 per cent of the stock of the Castle and receives shares in the company as compensation for money spent on the property. It is stated unofficially that some $80,000 worth of ore has so far been developed, and also that the Temiskaming or the McIntyre may be invited to share in its development. The report is supported in that J. P. Bickell who is president of the Temiskaming as well as the McIntyre is interested in the remaining 49 per cent interest in the Castle.

At the time of writing your correspondent finds much speculation among mining men as to what affect the present peculiar situation at Toronto may have on the Department of Mines. The members of the Provincial Parliament from the precious metal mining districts are of the old political schools, Conservative and Liberal, and at the time of writing appear to be likely to be excluded from the governing body, the farmer members. The situation presents the possibility of the voice of the citizens of this district going unheard. The general opinion, however, appears to be that nothing serious will result, and that there is not cause for undue alarm.

The Nipissing Extension mine, formerly the Farah property is being de-watered, plans for its development having been completed. A new vein has been discovered on surface on the eartern part of the property. It has been stripped for a distance of about sixty feet and has an average width of about one inch of smaltite carrying silver values of several hundred ounces to the ton. The wall rock contains considerable leaf silver and is expected to compose substantial tonnage of mill rock. This new find, as well as the one made last June will be followed by aggressive work. Major E. H. Birkett is in charge of operations.

In the Elk Lake district interesting developments are taking place. The most important is that of the White Reserve mine, in the Maple Mountain section of the district where a recent surface discovery of high grade ore has been made. A pit has been put down about 15 feet and some very spectacular ore taken out. In the meantime, a crosscut at the 140 fet. level is being driven for the purpose of tapping the new vein at that depth. As a result of previous work at the property, about twenty veins have been discovered. About 1,100 feet of lateral work has been done at the 140 ft. level. The property is equipped with a nine-drill compressor and corresponding equipment. At present two machines are working.

The Paragon-Hitchcock at Elk Lake is working, and encouraging results at the 200-ft. level are reported. A vein close to two feet in width is being explored.

It is contended by mining men who have had previous experience in both Cobalt and Elk Lake, that the latter district presents favorable possibilities of successful mining developments due to the similarity of geological conditions in Elk Lake as compared with conditions in Cobalt. It is stated that the knowledge gathered during he course of fifteen years of mining on Cobalt may be expected to be used to good advantage in the Elk Lake district.

In Gowganda a number of properties are being explored. For the greater part they all turn to the history of the Miller Lake-O'Brien for inspiration. This is the one successful mining operation in the Gowganda district, one of the richest deposits of silver in the world having been opened up and from which the company has recently been producing silver at the rate of over a million ounces annually. For a time, in its early days, the Miller Lake O'Brien appeared to be a doubtful proposition, and was only developed successfully by reason of Senator M. J. O'Brien refusing to give up, so to speak, and carrying out the exploration of the property from his private fortune. Other operators in the district, are often found pointing to this precedent, and express the thought, which is an offspring of the hope that history will repeat itself in Gowganda.

In the South Lorrain area, the Pittsburg-Lorrain and the old Keeley mine are the only active properties, although here, as well as at Elk Lake, an early revival of activity is being optimistically predicted.

In the gold mining camps satisfactory progress is being made, and there are now a greater number of operating mines than at any previous time during the past two years.

It is intimated that the Hollinger Consolidated will be a heavy purchaser of Victory Loan 1919 bonds. The present surplus of the company is well over three and a half million dollars of which close to two million is made up of bonds of previous loans. It is understood some of this may be converted into the new loan and that a substantial amount will be added to the total. The shortage of labor is still a retarding factor at the Hollinger, the arrival of Fall not having brought men in desired numbers. However, November and December are the two months that are looked to to bring the desired change and thus make it possible to prepare to operate at full capacity instead of less than two-thirds as at present. Although officials are reticent regarding the matter, current rumors tend to indicate some possibility of the Moneta property being taken over by one of the producing mines. It is reported unofficially that both the Hollinger and the Porcupine Crown have exhibited a desire to secure the property. The Moneta adjoins the Millerton side of the Hollinger on the west and seems to present fair possibilities of having the westward continuation of some of the ore bodies found on the latter. As to this, of course, only exploration and development work can determine.

The Dome Mines has recently been able to increase its capacity to about 1000 tons daily, thus handling twice the volume of the McIntyre and about two-thirds as much as the Hollinger. During one day, which was the exception, some 1,500 tons of ore was hoisted. It is plainly evident that the Dome is getting back into its stride in record time. If, with a little under 300 men employed, the Dome is able to handle 1000 tons of ore daily no further evidence is necessary to show that costs of operation are being held well with in bounds. For instance, a larger force of men is engaged at the McIntyre-Porcupine where an average of but 500 tons is treated daily and where costs are held down to around $5 to the ton.

Mr. R. E. Hore has returned to Toronto after examining properties in the Shining Tree Gold district. Mr. Hore was recently in Butt township to see the radium ore deposit discovered by Mr. Elliott.

Bullion Shipped From Cobalt.

During the week ended October 24, six Cobalt companies shipped an aggregate of eight cars containing approximately 576,213 pounds of ore.

Following is a summary:—

Shipper	Cars.	Pounds.
Buffalo	2	175,965
Nipissing	2	149,637
Coniagas	1	65,611
Dominion Reduction	1	65,000
La Rose	1	60,000
Peen-Canadian	1	60,000
Totals	8	573,213

During the corresponding period the Nipissing and the Mining Corporation each made bullion shipments the total amounting to 179,102.88 fine ounces, as shown in the following summary:—

Shipper	Bars.	Ounces.
Nipissing	76	101,048.65
Mining Corporation	79	78,054.23
Total	155	179,102.88

Annual Meeting of McIntyre-Porcupine Mines.

The annual meeting the shareholders of the McIntyre-Porcupine Mines was held on October 24th in Toronto when encouraging reports were received. While no definite statement was forthcoming as to an early increased divident to the shareholders. President J. P. Bickell said that the company's earnings had improved during the four months since the close of the fiscal year and if no unforseen difficulties arose, it looked as if the net earnings for the year now entered upon would be twenty-five per cent above the earning for the year covered by the last report. A surplus was being a accumulated and if that kept on increasing the board would be justified in increasing the distribution of profits. A by-law was ratified reducing the membership of the board from 7 to 5. The five directors previously serving were then re-elected which meant that the places of the late George E. Drummond of Montreal and E. F. B. Johnston of Toronto were not filled. Officers from the mine reported that the shaft is now down 1,500 feet and cross-cutting will now be begun for the 200 feet to reach the vein. The mine is now opened up on the 1,125 foot level.

Development of White Reserve.

Reports from the North say that the White Reserve property in the Maple Mountain section of the Elk district is undergoing considerable development, a vein recently opened showing some very promising silver. The White Reserve Mine is controlled by J. A. McAndrews of Toronto, who was associated with the Abitibi Pulp and Paper Company in the early days of that enterprise. Mr. McAndrews predicts a prosperous future for that area, including the Darby Lake and Skull Lake district. The mine is situated close to the east boundary of the township of Whitson and is about five miles northwest from Lady Evelyn Lake.

Exploring the Kennedy Group.

A report from Boston Creek states that a new company is being formed for the purpose of developing and exploring the Kennedy group of claims on the boundary of Boston, while arrangements are proceeding for the development of the Hohenaur property at Kirkland Lake. On the Mondeau property now known as the Peerless work has proved to be sufficiently encouraging to proceed with the installation of a more powerful mining plant.

To Develop the Boyce Claims.

Announcement is made that the old "Boyce group" of claims in the Porcupine district has been sold to strong Canadian financial interests in Toronto, Hamilton and Montreal. The deal was arranged by A. S. Fuller of Timins, Tanner, Gates & Co Toronto and J. R. Starnes, Montreal. The property will now be known as the Gold Centre Mines, Limited, a $3,000,000 corporation having been formed for taking over the claims. There are five claims adjacent to the Hollinger Consolidated, the McIntyre, Dome and West Dome.

Progress at the Clifton Mine.

Homer L. Gibson and a party of twelve returned to Toronto on Sunday last after several days spent on a visit of inspection to the Hollinger, Dome and Clifton Mines. The latter mine is a prospect on which developing work is just starting. The operating company has now 25 men undreground and has just completed the installation of an electric plant in order to work the 500 foot level. Mr. Gibson states that ore has been found in three veins at the first level. At the Dome Mine the party found the labor situation greatly improved and the indications are that during the winter an adequate force of help will be available.

STOCK PROMOTIONS DISCREDITING WEST SHINING TREE GOLD AREA.

Regarding the West Shining Tree gold area about which much has recently been written, and more said, the writer has consulted the opinion of two of the leading geologists of the Dominion—recognized as such by mining men of the highest standing, and as a result feels assured that an unbiased summary of the situation is this:

The geological conditions of West Shining Tree are such as encourages the belief that commercial deposits of gold ore should be found in that area. There may not be a certainty of this, but there are at least excellent possibilities. One geologist pointed out that he felt optimistic over the camp's future, and that he had found it necessary to disregard the numerous stock promotion schemes in order to become optimistic. In the opinion of both geologists, the present situation appears to be attended with possibilities of the camp falling into bad repute, getting a black-eye, so to speak, and in a sense throwing the whole thing into "near-liquidation." This, not due to lack of merit or potentialities, but due to some of the properties being saddled to, and subject to the greed of a few men who are playing the stock end of the game.

"I am optimistic about the potentialities of West Shining Tree, and, in this, am anxious to compare notes with other mining geologists," said one of the gentlemen interviewed. "In the Porcupine camp," he said, "we all know how easily the area which now comprises the paying mines could have been missed if effort had ceased with such early discoveries as the Rea. I am optimistic about Shining Tree, not that I feel certain that mines have already been found, but in the hope that owners of claims will remove a little more moss, expose a little more rock and perhaps as a result make more important discoveries than those already made."

In the gold mining camps of Northern Ontario the propositions in which brokers have played a leading part have practically all landed in the scrap heap. It is a broad statement, but it is true. The profitable operations do not owe their success to the brokers. In their order of importance they may be cited: First, the Hollinger is the product of the optimism of the Timmins Brothers and their Montreal and Toronto associates; second, the Dome, is the product of first the Mond Nickel Company, and later Mr. De Lamar; third, the McIntyre became successful owing to the efforts of the late Col. A. M. Hay; fourth, the Lake Shore was brought to a profit-producing basis by Harry Oakes, the proposition being adversely criticised by disgruntled stock brokers because they were refused the opportunity of using the Lake Shore as a means of fleecing the public; fifth, the Porcupine Crown won success through the efforts of the Crown Reserve Mining Company.

If some system could be devised whereby the brokerage houses, or a great many of them, could be prevented from exhibiting unreasonable greed, and permitted to devote themselves earnestly to the work of soliciting capital to be used in the exploration and developing of mining prospects, the mining industry of this country would be greatly benefitted. To this end it would be necessary to limit the amount of commission which the brokers might charge for selling unlisted stocks. As matters now stand, they are permitted to underwrite stock at perhaps 10 cents a share and sell it at 20, 30 cents or whatever they are able to get. Instead of the money finding its way to the treasury, everything above the underwritten price goes to the broker, sometimes amounting to more to the latter than to the treasurer. Such, of course, quite obviously reduces the chances of developing mining property successfully. When the difficulty, under favorable conditions, of developing mining property from a raw prospect to a dividend-paying mine is considered, it is indeed small wonder that so many of the propositions with which the broker is associated and gets his "hand-out" should fail—hence the fear that the promising West Shining Tree camp is saddled with a condition that will ultimately be found to have done it an injury.—J. Mc.R.

The remark, we so often hear, "Ore is where you find it," always reminds me of the old Cousin Jack (Cornishman) tributer, when asked how his 'pitch' was looking, who said: "Thee knows 'ow they bloody h'ore ez, me son, sometimes ez 'eer and sometimes theer, and weer 'ee edden, theer be oi." In plain English, "You know how ore is, my son, sometimes it's here and sometimes there, and where it isn't there am I." I claim that to be pretty pat.—Extract from a letter to the Editor of M. & S. Press.

Considerable interest is being taken in Nigeria in a new discovery of silver-lead. There is a highly-mineralized belt of about 50 miles in length, and ore bodies have been located up to a width of 50 ft.

Nova Scotia Notes

It is announced the Dominion Steel Corporation has subscribed $25,000 to the erection of a general hospital to serve the Town of New Waterford and the surrounding district, where the Dominion Coal Company has now five collieries in operation. The present hospital, which is only a temporary arrangement, is quite inadequate, and the need for a larger hospital has been long felt. The revenue for the work of the Hospital will be derived, as is customary in the Glace Bay district, from monthly contributions by the colliery workmen, from provincial and municipal grants donations from the colliery companies and private subscriptions.

The Dominion Coal Company has recently equipped and opened a clubhouse for its officials at Glace Bay. The club is handsomely furnished with library, billiard-room and the usual club appointments, including a ladies' section, and provision for meetings and official dinners.

The Dominion Coal Company, according to newspaper reports, contemplates immediate operation of its areas in the North Sydney field from Bonar Head, contiguous to the workings of the Nova Scotia Steel and Coal Company. This report would appear to indicate the unlikelihood of any amicable arrangement between the Dominion and Scotia companies for the partition of areas in this locality.

It is announced that a zinc-copper-lead property held under lease by James Nolan of Glace Bay has been placed under option to Capt. P. J. Webb of Sydney, who is endeavoring to dispose of the property to American interests.

The leases cover areas near Stirling, Richmond County, Cape Breton Island. Some $40,000 has been expended in proving the property, and it is stated that ore of good quality has been exposed along the general direction of strike for about 1,000 feet, showing a width in one trench of 66 feet. Analyses of the ore are said to have shown 33 per cent zinc, 13 per cent lead, 3.68 per cent copper, with important yields of associated gold and silver.

The following account of this mineral occurrence is contained in the Summary Report of the Geological Survey for 1918, part F, by A. O. Hayes.

Stirling, Richmond County. — Descriptions of the development work on the Stirling zinc-lead-copper deposit previous to 1918 were published by D. D. Cairnes [1] and A. O. Hayes [2]. No development work was done from July 17, when the Stirling Exploration Co. stopped driling to July, 1918 when the New Jersey Zinc Co. commenced operations under an option to purchase from the original lessee, James Nolan of Glace Bay. J. T. Boyd is in charge of the present development work by which it is planned to prove the deposit at a greater depth than accomplished by the Stirling Exploration Company in 1917. Five calyx drills removing 3-inch cores were in operation, putting down holes at 35 degrees from the vertical. The drills were placed east and west of the line of extension of the deposit and boring carried on from opposite sides. The gangue, which varies from dense quartz to somewhat porous carbonate schist, offered great difficulty for the type of drills used and progress was, therefore, made more slowly than anticipated.

The drilling in 1917 indicated an impoverishment of the ore both laterally and in depth from the principle showing illustrated as Trench C in D.D. Cairnes' summary report [1] for 1916. Towards the south there is a heavy overburden of boulder clay and surface trenching is impracticable. The drilling 400 feet south of Trench C showed no ore, whereas 200 feet south of French C the ore-body was much smaller than the holes drilled under the principal showing, which also showed gradual impoverishment to a very low grade ore between vertical depths of 200 to 350 feet. Surface trenching at intervals to the north of Trench C shows a splitting of the higher grade ore into narrow bands which terminate entirely about 500 feet north. A hole drill hole placed about 200 feet north of Trench C shows similar characteristics at depths of 150 to 300 feet vertically with low grade ore predominating.

In September 1918, a boring on the west side of the known deposits entered ore, indicating the presence of another band. The lenticular form and magmatic source of the ore suggests the probability of the occurrence of additional related ore, both laterally and in depth.

The country rock consists of a volcanic series of pyroclastic rocks and lava flows of rhyolite and trachyte, with interbanded carbonates of lime magnesia and iron, apparently alterations of the volcanic rocks. These are intruded by plutonic rocks consisting of diabase, quartz porphyry, and a porphyrite. There is also a dyke of mica diorite cut in a diamond drill hole at the south end of the ore-body and in a trench at the north end of the ore-body a similar dip is about 10 feet thick. This dyke was not encountered in any of the other drill holes, although they penetrated the intervening formation; therefore, two different dykes may occur. Although no large exposure of this rock was found in the vicinity of the workings, a similar intrusive plutonic rock occurs in large quantity, cutting a similar volcanic series, on the coast west of Seal rock between Framboise and Capelin cove about 5 miles south of Stirling.

The whole series has undergone metamorphism accompanied by shearing with the development of a schistose structure, having a strike of north 31 degrees east (astronomic) with steep easterly dip. The ore appears to lie along one of the shear zones. The ore consists of a fine-grained, intimate mixture of the following sulphides in order of their abundance; sphalerite, pyrite, galena and chalcopyrite, containing small amount of gold and silver. The ore varies from high grade, consisting of an almost solid sulphide mass accompanied by a small amount of gangue, principally calcite with subordinate quartz, to low grade, largely calcite with some quartz, containing a small amount of the sulphides disseminated through it in small masses. In the lower grade ore there is a greater proportion of pyrite to total sulphide contents, than in the higher grade ore.

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[1] Geol. Surv., Can., Sum. Rept., 1916, p. 255.
[2] Geol. Surv., Can., Sum. Rept., 1917, pt. F. p. 30.
[1] Geol. Surv., Can., Sum. Rept., 1916, Fig. 11, p. 257.

THE APPLICATION OF PULVERISED COAL IN BLAST FURNACES.

The Canadian Mining Institute Bulletin for July contained a description of the progress made in using pulverised coal in blast furnaces which made the following references to the smelting of iron:

History of Early Attempts.

"The use of pulverised coal in reverberatory furnaces, cement kilns, open hearth furnaces, boilers and other similar furnaces, has been dealt with extensively in many papers and publications; the present paper on the other hand will be confined to the application of pulverised fuel to blast furnaces, wherein the mixture of fuel and air is injected into the lower portion of a piled mass of material, and combustion takes place under pressure.

Until recently the history of pulverised coal in blast furnaces contained nothing but records of failures. Sir Lowthian Bell, in his book on the "Principles of the Manufacture of Iron and Steel" published in 1872, which deservedly ranks among the world's metallurgical classics, mentions an attempt to introduce finely divided coal with the blast at the tuyeres in an iron furnace; the attempt was soon abandoned, and Bell remarked that it needed but little consideration to insure rejection of all such schemes.

About 1902, Mr. W. J. Forster of Darlaston, England, satisfied himself by a great number of experiments at the Darlaston furnaces: "That nothing but failure can be expected from the addition of cold materials into the hearth of the furnace with the blast."

Possessed of this opinion, Mr. Forster suggested the use in the blast furnace of a specially prepared carbon obtained by heating solid carbon to a very high temperature, so that all volatile matter and moisture should be expelled and the carbon should be strongly heated before its use in the blast. He obtained British and American patents on the expedient of so preparing carbon and introducing it with the blast, whereby he hoped to make special grades of iron. The idea seems to have produced no effect upon the art of smelting iron, but it may be considered to illustrate the rest of the history of the use of pulverised fuel in blast furnaces as this history consists of sundry comparable suggestions of expedients all of which have, so far as known, failed to meet with practical success. The efforts to use successfully pulverised fuel in iron blast furnaces have embraced such expedients as the substitution of heated gas, with and without superheated steam, for some or all of the air; the careful classifying of the fuel into different and distinct sizes with a view to employing the finer grade to create a high initial temperature to ignite the rest; the substitution of an annular reverberatory arranged around the base of the charge, and the injection tangentially thereinto of the powdered coal and air; the grinding and mining of the charge itself so that the particles might fall through a stream of burning fuel and air, and so on. It is not profitable for present purposes to consider all these expedients or the various patents which have been granted on them, because, so far as is known, none of them has been sufficiently successful to secure adoption.

The results obtained by the recent work which we shall now describe have been attained not so much by resort of extraneous expedients as by the development of the combustion process itself. The chemical phenomena of combustion are relatively little known, although they have been made the subject of important research work by numerous scientists since the days of Bunsen, who, in 1845, made investigations on a coal-fired blast furnace used for the smelting of iron ores; and it is impracticable, within the limits of this paper, to discuss these phenomena in detail. The phenomena apparently embrace distillation of volatile matter, gasification, and combustion. When a mixture of air and finely divided fuel is directed into and against a mass of more or less refractory material, different results may ensue, according to variations in a multiplicity of factors. The work to be described seems to demonstrate that by proper provision of suitable space for combustion, maintenance of correct air pressure and fuel within the combustion space, it is practicable to develop within the charge a sort of supercombustion, which provides at greatly reduced cost the heat necessary to bring the charge to a molten condition. It is particularly difficult to generalise or define the possibilities or limitations of the generation of heat in a blast furnace so operated, for much depends upon the physical and chemical characteristics of the charge, as well as upon the variable factors directly entering into the combustion."

The authors suggest that a better idea of the work can be obtained by concrete illustration, and proceed to describe in great detail the experiments of Mr. Garred in a field which, the authors believe has heretofore been untouched even by suggestion, namely, the melting of copper and the smelting of copper ores.

At the plant of the International Nickel Company the most recent work has been to operate the furnace entirely without coke, following earlier work where an average of fifty per cent of the coke had been replaced. The results, with all coke eliminated, are sufficiently encouraging to continue the experimentation with this object in view.

The processes involving the application of pulverised fuel to blast furnaces have been patented in the United States, Canada, and many foreign countries; the patentees, Garred and Cavers, both being engaged in work connected with the smelting of non-ferrous ores, and both were simultaneously working on practically the same problem, of the combustion of finely divided fuel in a blast furnace. Owing to the magnitude of the problems involved, a consolidation of their interests was effected recently, by the formation of the Garred-Cavers Corporation, New York, which company has acquired the patents issued and pending in connection with this work. It is expected that experiments on the smelting of silver-lead ores will be commenced in the near future, and there is every reason to believe the prospects are good for increasing the efficiency of blast furnace practice.

During the last few years, some twenty to thirty million tons of non-ferrous ores per year have been treated in blast furnaces in the United States, Canada and Mexico, and it is believed that further developments of a satisfactory nature in connection with this work will enable a large proportion of these ores to be smelted with considerable economies in fuel.

The Garred-Cavers Corporation has made contracts and issued licenses for the use of its process by the

International Nickel Company of Canada, the Tennessee Copper Company and Cerro de Pasco Copper Corporation. Mr. W. J. Hamilton is Consulting Engineer to the Cerro de Pasco Company and arrangements have been made to utilize pulverised coal in the existing blast furnaces at the smelter, but also in a new smelter to be constructed by that Company.

While the application of pulverised coal, in its present development, does not extend to the smelting of iron in the blast furnace, it does not appear unreasonable to expect that the lessons learned from its use in non-ferrous smelting may lead to a wider application that may some day include the reduction of iron ores.

PERSONALS.

Mr. J. B. Tyrrell, accompanied by Mr. P. A. MacDonald, Public Utilities Commissioner of Manitoba, Mr. Phillips and Mr. McTavish, left Winnipeg recently to make an examination of the Gold Pan Mine in the Rice Lake District.

Mr. J. B. Tyrrell addressed an open meeting held in the Fort Garry Hotel, Winnipeg, under the auspices of the Manitoba Branch of the Canadian Mining Institute. The subject of the address was "The Mining Situation in Its Relation to Manitoba." Having recently returned from an extended trip through Northern Manitoba, Mr. Tyrrell was able to entertain his audience with an authoritative account of the mineral possibilities of the Province.

The Prince ready to go underground at the O'Brien Mine, Cobalt.

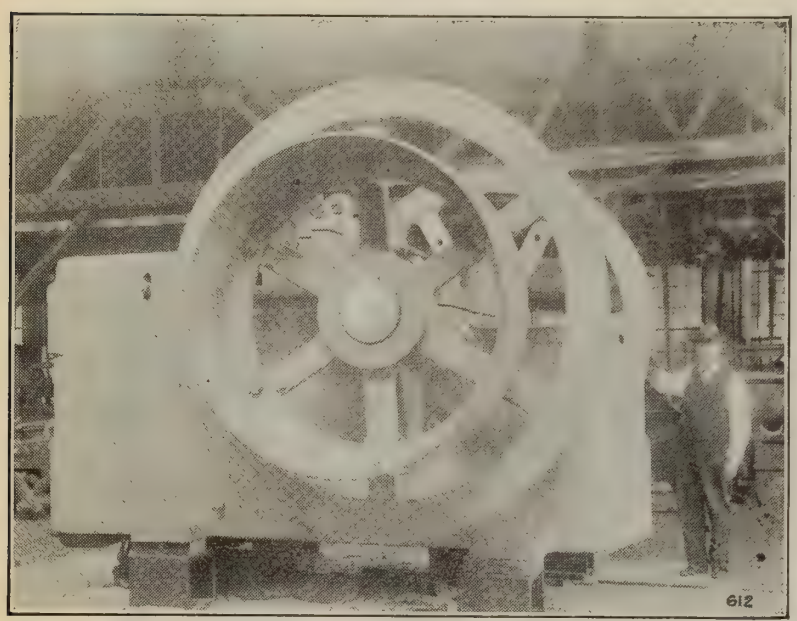
Mr. Hughes, the Prime Minister, has stated in the House of Representatives of the Commonwealth, that the Imperial Government had promised to advance £500,000 for the purpose of fostering the treatment of spelter in Australia, and the Commonwealth would also assist in the establishment of similar works.

Arrangements are being made by the Manitoba Branch of the Canadian Mining Institute for a lecture to be given by Dr. R. C. Wallace, Commissioner of Northern Manitoba and Chairman of the Branch. The meeting will be held in Winnipeg on October 23rd, and no doubt the speaker will deal with some aspect of the mining situation in Northern Manitoba.

LARGE ROCK CRUSHER BUILT IN CANADA FOR THE ASBESTOS CORPORATION.

One of the largest rock crushers in Canada has recently been installed at the British-Canadian Mines of the Asbestos Corporation of Canada, Limited. The bulk of the machine is clearly indicated by comparison with the man standing beside the rock crusher. Larger crushers have, of course, been built; but as a rule for special purposes, and not as far as the writer is aware, by any Canadian firm.

The general dimensions of the crusher are as follows:
Size, 42 ft. x 36 ft.
Weight of frame, 78,000 lbs.
Weight of swing jaw with bushing, 21,800 lbs.
Weight of flywheel and pulley, 7,000 lbs.
Weight of Pitman, 4,900 lbs.



Crusher for Asbestos Corporation.

All parts are unusually massive to withstand the heavy strains of crushing the large pieces of rock which this machine will have to handle; jaw and cheek plates are of manganese steel, and the Pitman is of bolted construction instead of being solid as in the smaller types of crusher.

The crusher is intended for primary crushing of the asbestos "mill" rock, and being able to handle comparatively large pieces of rock will effect a saving in the actual mining cost. The crusher was constructed at the Jenckes plant of the Canadian Ingersoll-Rand Company, Limited, Sherbrooke, and is the third of this size supplied to the Asbestos Corporation.

A unique mining plant is located in Ohio. Both coal and sand are taken from the one property which consists of 150 acres. The surface strata is high grade molding sand and has an average depth of about nine feet. It is deposited on a bed of shale about five feet in thickness and under this is a seam of excellent coal averaging from 4 to 5 feet. Shipments of sand already have been made to foundries throughout the country. A considerable tonnage of coal also has been mined. As the shale strata is uncovered by the removal of the sand, steam shovels will be utilized to strip the shale, thereby exposing the seam of coal which will be mined in the open.

A LARGE ROCK CRUSHER.

The modern tendency in mining engineering work is to instal larger and more powerful rock-crushers rather than to multiply the number of those in use. The largest gyratory rock-crusher in the world has recently been laid down, its dimensions being as follows: Height from foundations to the top of the hopper, 17 ft. 8 ins.; diameter of hopper, 19 ft. 6 ins., the length of the shaft, which is 10 ins. in diameter, being 21 ft. The receiving opening are 60 ins. by 190 ins. and the diameter of the rope sheave driving pulley is 7 ft.

The weight of the complete crusher is about 358 tons and it is capable of dealing with from 2,500 to 3,000 tons of rock per hour, crushing an 8-in. or 9-in. product. When running under full load the crusher requires a driving power of about 350 h.p., and it absorbs 75 h.p. when running light. The working parts are lubricated by a forced feed, a pump situated in its lower portion driving a thick oil to all bearings. The oil sump from which the pump draws its supply contains nine barrels of oil, and all surplus is returned through coarse filters to the sump. The crusher in question has been designed and laid down to deal with the output of a number of steam shovels at a big limestone quarry, the material being dumped into the hopper from trucks holding 12½ tons.

THE SILVER SITUATION.

There has been very heavy buying of silver for Far Eastern account. India would buy this country's annual yield, according to well posted silver men, if it were available and still need more. Of late China has been buying heavily, both in New York and London.

The demands of the Far East for silver have many times proved the mainstay of the market for this metal. Just what happens to the great quantities shipped there has never been satisfactorily explained, although silver always figures in trade between India and China and the Western world.

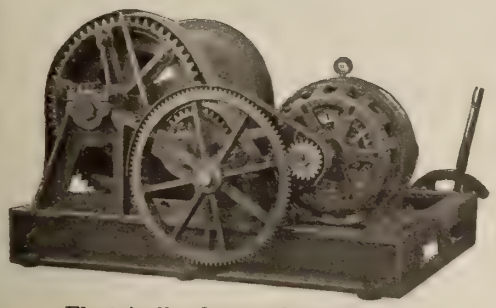
In China silver still is minded into taels or shoes. When troops returned from their participation in the Boxer uprising two decades ago they brought with them quantities of these silver shoes, which were worn for a time as charms.

While there was some interest shown on the part of producers a few months ago in the subject of an export combination the matter seems to have passed from mind. One active producer says: "We are selling all the silver we can produce through banks in New York and are getting good prices. Under the circumstances we fail to see how a combination would be of any assistance."

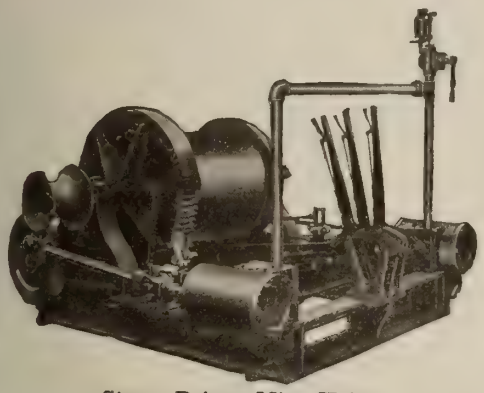
New York producers have sold silver metal this week at $1.23½ an ounce, the highest price reached in over 50 years. For the most part this metal was taken for shipment to China.—Boston News Bureau.

PURCHASE OF FLIN-FLON MINE DENIED.

The Emergency issue of the "Engineering & Mining Journal" states that a denial has been issued by Hayden Stone & Co. of the reported purchase of that mine by interests connected with this well-known Boston and New York firm.



Electrically Operated Mine Hoist.



Steam Driven Mine Hoist.

7 OF OUR MINE HOISTS IN USE BY ONE N.B. MINER 7

and this is not the only firm in Canada using seven of our Hoists.

Would these customers continue to purchase our Hoists from year to year as their business grows without a good reason?

Quality and service count for much more than price in the long run, and while we can assure you that the price of our Hoists is reasonable, the price alone would not have secured us these many repeat orders. These customers were satisfied with the quality of the Hoists, the honest workmanship and material put into the machines, the skill exercised in their design, and their comparative freedom from premature breakdowns or repairs.

Our Mine Hoists are built right, and give the best of service—that is why our customers stay with us, and continue to order more machines as their needs increase.

Choice of 7 sizes in either Electric or Steam Hoists, ranging from 10 H. P. to 50 H. P.

MARSH ENGINEERING WORKS, LIMITED, Established 1846 **BELLEVILLE, ONTARIO**

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BOLINDER'S Heavy Crude Oil Engine

FOR MINING AND INDUSTRIAL PURPOSES

Built by a Firm who Stands Supreme in the Whole World as Oil Engine Experts.

The Bolinder operates on a cost of only ½ cent per Brake Horse power per hour—an enormous Saving as compared with a Steam plant. A 200 B.H.P. Bolinder (which is equal to a 250 I.H.P. Steam engine) costs only $1:—**per hour at full load.**

The Bolinder eliminates firemen and fire hazard.

The Bolinder is the result of 30 years' experience.

Simple

Reliable

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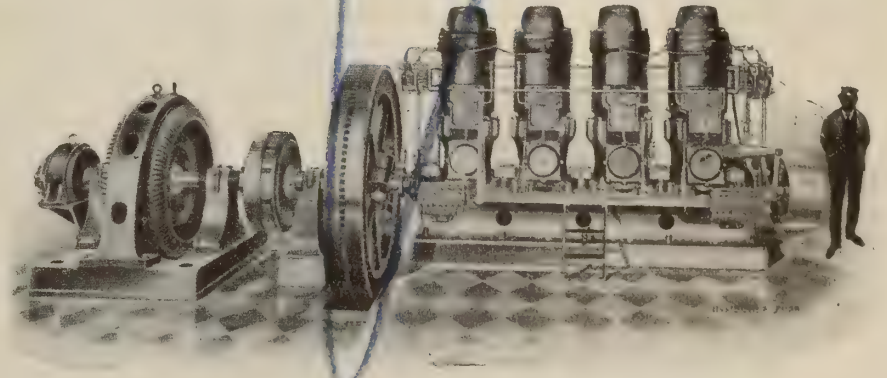

A 320 B.H.P. Bolinder Engine directly connected with a Generator.

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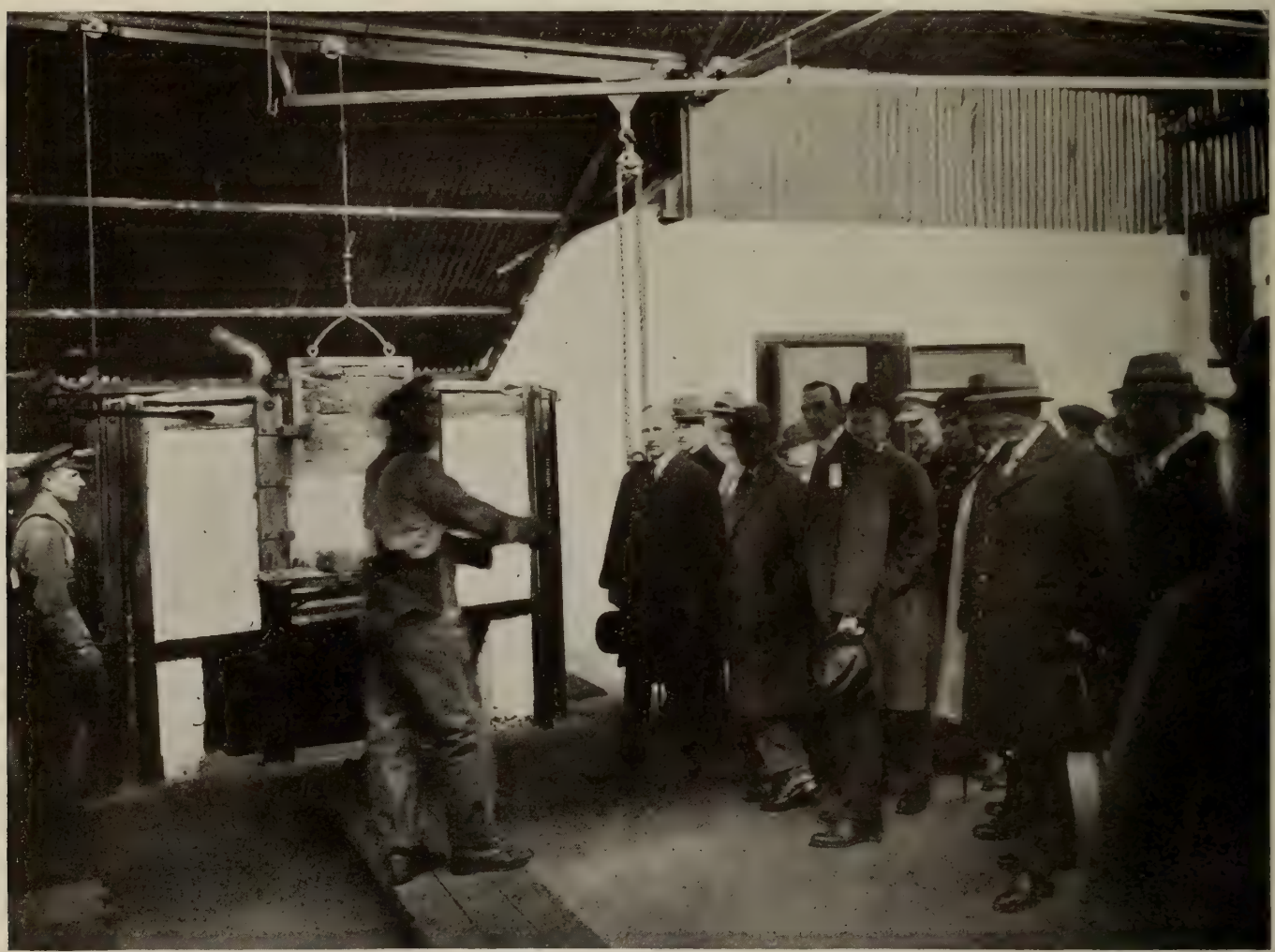
Manitoba Can Manufacture Briquettes.

Hon. T. H. Johnson, attorney-general, has stated that the successful manufacture of briquettes in the lignite fields of southwestern Manitoba is assured and the plan has proven entirely feasible.

In a recent trip to Ottawa Mr. Johnson was shown over the experimental plant of the lignite utilization commission at Ottawa. He says that the commission was proceeding with plans for the erection of a plant which would produce briquettes on a paying basis and would prove the industry to be a good profit-making enterprise. The briquettes, he said, would be placed on the market in the fall of 1920 and would sell for approximately $10. per ton. They were in every way equal to the American anthracite coal. The commission is being financed by the federal government and the provincial governments of Manitoba and Saskatchewan.

The federal officials have been much impressed with the necessity of developing the mineral resources of Manitoba and have given their assurance that surveying for a railway line, from The Pas to the gold belt about 73 miles north of The Pas, will start immediately.

Railway officials, who have visited the fields since the recent big strikes, believe that railway could be operated at a good profit. The provincial government were considering the advisability of erecting a railway, which will cost about $2,000,000 had the federal government refused to take any action.



The Prince witnesses the pouring of silver bullion at the reduction plant of the Mining Corporation, Cobalt.

Manitoba to Have Railway to Northern Gold Fields.

On September 30, after having interviewed Hon. Arthur Meighen, Minister of the Interior; Hon. J. D. Reid, Minister of Railways; and Hon. J. A. Calder, Minister of Immigration, regarding the erection of a railway to the gold fields of Manitoba, Premier T. C. Norris announced that surveying for a railway line will start this Fall.

MINING ENGINEER, Scotch, University and Royal School of Mines, liberal education, 30 years wide general experience, business success, responsible manager German and Spanish mines, underground and large open workings, copper, lead, limonite, lignite, manganese, exceptional knowledge diatomite, expert surveyor, two years successful college lecturer; Mining and Surveying, experienced prospector, reporting, best references for ability and character, excellent health, go anywhere at once, prepared to earn promotion, steady employment with good concern desired.

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The Minerals of Nova Scotia

THE MINERAL PROVINCE OF EASTERN CANADA

COAL, IRON, COPPER, GOLD, LEAD, SILVER, MANGANESE, GYPSUM, BARYTES, TUNGSTEN, ANTIMONY, GRAPHITE, ARSENIC, MINERAL PI GMENTS, DIATOMACEOUS EARTH.

Nova Scotia possesses extensive areas of mineral lands and offers a great field for those desirous of investment.

Coal Over six million tons of coal were produ ed in the province during 1916, making Nova Scotia by far the leader among the coal producing provinces of the Dominion.

Iron The province contains numerous districts in which occur various varieties of iron ore, practically at tide water and in touch with vast bodies of fluxes. Deposits of particularly high grade manganese ore occur at a number of different locations.

Gold Marked development has taken place in this industry the past several years. The gold fields of the province cover an area approximately 3,500 square miles. The gold is free milling and is from 870 to 970 fine.

Gypsum Enormous beds of gypsum of a very pure quality and frequently 100 feet thickness, are situated at the water's edge.

High grade cement making materials have been discovered in favorable situations for shipping.

Government core-drills can be had from the department for boring operations.

The available streams of Nova Scotia can supply at least 500,000 h.p. for industrial purposes.

Prospecting and Mining Rights are granted direct from the Crown on very favorable terms.

Copies of the Mining Law, Mines Reports, Maps and other Literature may be had free on application to

HON. E. H. ARMSTRONG, - HALIFAX, N.S.

Commissioner of Public Works and Mines

PROVINCE OF QUEBEC

MINES BRANCH

Department of Colonization, Mines and Fisheries

The chief minerals of the Province of Quebec are Asbestos, Chromite, Copper, Iron, Gold, Molybdenite, Phosphate, Mica, Graphite, Ornamental and Building Stone, Clays, etc

The Mining Law gives absolute security of Title and is very favourable to the Prospector.

MINERS' CERTIFICATES. First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is $10.00, and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

SIX MONTHS AFTER STAKING. At the expiration of six months from the date of the staking, the prospector, to retain his rights, must take out a mining license.

MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of $10.00 on issue. It is valid for one year and is renewable on the same terms on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of $5 an acre for SUPERIOR METALS, and $3 an acre for INFERIOR MINERALS

The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized belts are known to exist.

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The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

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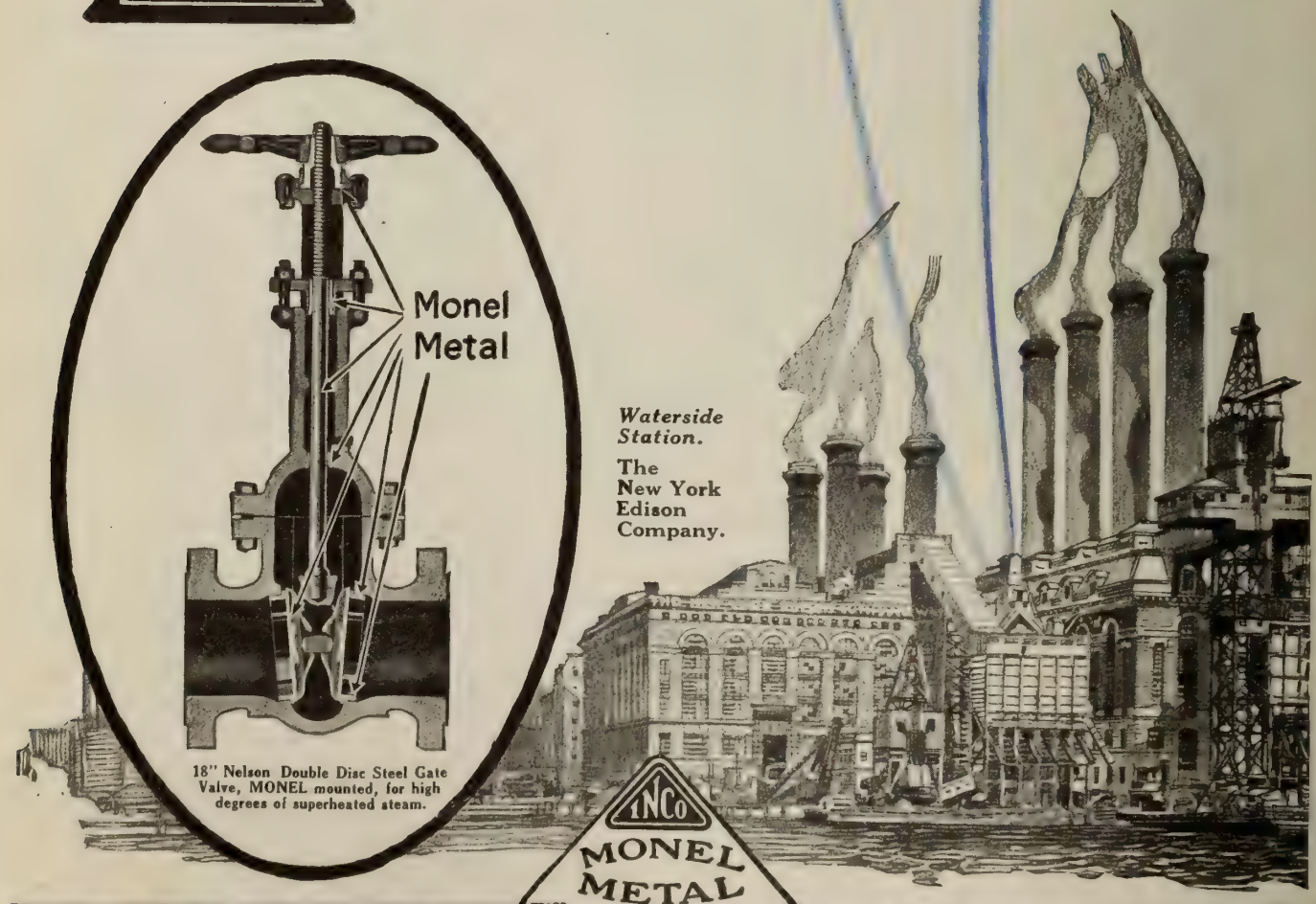

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EDITORIAL

Electrification of the Canadian National Railway in Nova Scotia

The question of the electrification of a portion of the Canadian National Railway in Nova Scotia is raised in this issue by Mr. C. H. McL. Burns of the Maritime Coal, Railway & Power Co. The same question was rather fully discussed at the annual meeting of the Mining Society of Nova Scotia in 1917 and again in 1918, and while there was some hesitancy on the part of the coal men present, because of a possible diminuation of the quantity of coal required to operate the railway under electrification, there was very general agreement that not only was electric operation possible, but that it was desirable.

Mr. Burns's article points out that electric power may be generated from the slacks and inferior coals, which are, if not exactly a by-product of coal-mining, yet products that are not easily saleable and are unable to stand the cost of any long distance of rail haulage. This is in fact the method which the coal companies in Nova Scotia are using to supply the power required to operate the collieries. The Dominion Coal Company, in particular, has developed the application of electric drive to most of the operations at its collieries, distributed over a very wide radius, and is used dust-fired boilers with success. In fact, very little fuel of first-class commercial grade is now being used at Nova Scotian collieries, and the practice pursued at the collieries for a number of years has demonstrated not only the convenience and efficiency of electric power, but the economies arising from the generation of electricity in central power-stations with the use of low-grade fuels.

The question of grades is a serious one between Truro and Moncton. The adaptability of the electric locomotive to heavy grades is generally admitted and the President of one railway in the Western States has stated that the electric locomotive had enabled them to forget the continental divide.

As Mr. Burns mentions, the water-powers of the Maritime Provinces do not hold out much hope of generating large quantities of cheap electricity, and coal must always be the source of whatever motive power is used on the eastern railways, to a very large extent.

Those who favour electrification of the National Railways in Nova Scotia would electrify the whole of the road from Sydney to Moncton at least.

It is pointed out that main generating stations could be placed along the line of railway to take advantage of the main coalfields of Sydney District, Inverness (by a station at the Strait of Canso), Pictou, and Cumberland County, including the extension of the Cumberland field into New Brunswick.

It is also thought that, by a system of light electric railways, feeding lines could be used to open up the districts of Nova Scotia which are today undeveloped, and must remain undeveloped until transportation is provided.

The question raised by Mr. Burns is one that we have by no means heard the last of in the Maritime Provinces. Nova Scotia's long sea frontage, her excellent harbours, and the natural position of the main centres of population on these harbours, has for a long time obscured the lack of proper transportation in the interior, a lack that extends both to highways and railways.

Considering that Nova Scotia has for a century been mining and exporting coal, that Cape Breton coal was used in the fireplaces of both Boston and New York before it was known that anthracite would burn, it is surprising how long the people of that province have endured the limited use that has been made of electricity and coal-gas. In the Sydney coalfield, the richest bituminous coal area in Canada east of Alberta, where hundreds of thousands of tons of coal are annually subjected to destructive distillation for the manufacture of coke, no such convenience as a gas stove is to be found. Not a single industry (beyond the basic industries of coal-mining and steel manufacture) is to be found in the Island of Cape Breton attracted there and having its manufacturing costs based on cheap power. This is something that can be said of no other coalfield of like length of development, and is certainly something to be thought over. Exactly the same may be said of the Pictou, Inverness and Cumberland coalfields—modified to a small extent in relation to the vicinity of New Glasgow.

The coal mined in Nova Scotia has for generations gone to provide the driving power for the industries of New England, Quebec and Ontario, and has, in large part, been followed by the youth and energy of the Province. Mr. Burns's proposal has a wider application that he has used, and it is probably unnecessary to excuse this amplification of a subject that must always bulk largely in the thought of those who have seriously considered the stationary, if not retrograde position of Nova Scotia, when compared with the other provinces of Canada.

Problems of the Maritime Provinces

At the recent meeting of the Maritime Board of Trade which was convened in Moncton a broader and more united spirit is stated to have prevailed than at any previous session. There was absolute unanimity of opinion on the advantages of Maritime Union, the necessity for the division of the Canadian National Railway into units, with a Maritime Province unit from Montreal or Quebec, and the necessity for a thorough geological re-survey of the Maritime Provinces.

The Province of Nova Scotia has been fairly well mapped geologically, but the maps badly need revision. New Brunswick is in large measure a terra incognito from a geological standpoint, largely of course because of the dense forest still covering a large part of that province. While more is known of the coal occurrences of Nova Scotia than is known of other mineral deposits of that Province, yet it cannot be said that any notable addition to our knowledge of the maritime coalfield has been made in the life of the present generation, or since the untimely death of Hugh Fletcher. The maritime coalfield includes the well-known seams of Sydney, Inverness, Pictou, Cumberland and Joggins, and the lesser known occurrences of New Brunswick and Newfoundland, with the possibility of concealed coalfields in Cumberland County and under the Permian cover of Prince Edward Island, and possibly also under the waters of the Bras d'Or Lake. The labours of many eminent geologists, from Sir J. W. Dawson and Abram Gesner down to the work done by Dr. A. O. Hayes and reported in the Summary Report of the Geological Survey for 1918, have been expended on the mapping and stratigraphical position of the maritime coalfield, but the problem has never been conceived as a whole, and no application of the newer developments of what may be termed "coal geology" has been made to the ascertained facts of this coalfield, which is essentially a single deposit covering roughly a parallelogram 200 by 300 miles in extent, having at its four corners the mouth of Chaleur Bay in the west; Fredericton, New Brunswick in the south, Arichat, Cape Breton, in the east; and the head of St. George's Bay, Newfoundland. in the north.

The configuration of the pre-Carboniferous rocks on which the Coal Measures were laid down, the subsequent earth movements, and the co-relation of the separated basins of the original coalfield, are matters worthy of the concentrated lifestudy of a competent geologist, but no geologist has as yet been able, or willing, to tackle this great and worthy task in the same way that Prof. Lapworth and Prof. Kendall worked at the problem of the concealed coalfields of England.

Even the lesser problem of co-relation of the seams within the known sub-divisions of the main coalfield has not been attempted, and, with all the added knowledge since his day, with all that we have learned through microscopic examination of coal sections, and of the persistence of maritime or fresh-water shell horizons associated with coal-seams, no one has made a better guess at the co-relation of the coal-seams in the several basins of the Sydney coalfield than did Richard Brown in 1865.

In Newfoundland, the situation is even more backward. Statements are made by responsible ministers of Newfoundland regarding the existence of large coal deposits in that country, but the exact geologic ascertainment of the basis for such statements is lacking, because Newfoundland has never been geologically surveyed as that term is understood today.

Whether political union of the Maritime Provinces should include Newfoundland is for Newfoundland alone to say. But from the standpoint of geological science, Newfoundland should be included in any systematic re-survey of the Maritime Provinces.

The Maritime Board of Trade is to be congratulated on its broader vision. It is on the right track. The undeveloped Maritime Provinces — for undeveloped they certainly are—cannot stand against the growing population and infinitely greater acreages and natural resources of the western provinces if they persist in disunity and unnecessary expenditures on administration.

We do not know whether the Maritime Board of Trade discussed another problem of the Maritime Provinces, namely, the need for a unified and enlarged measure of technical education. The dissipation of energy in educational problems in these provinces is not less marked, nor less detrimental, than the archaic and almost laughable spectacle of three full-fledged administrations, with upper and lower houses, speakers, lieutenant-governors and all the paraphenalia of government in a territory that nature and art and horse-sense indicate should be one and undivided.

LE PRINCE CONQUERANT.

The Prince of Wales was mentioned in despatches as having efficiently performed the duties of a liaison officer between French and British forces in the war. His ability has been demonstrated with no less distinction in the Province of Quebec, where he will be affectionately remembered as the liaison officer of racial concord and as **le prince conquérant.**

Should the Government Electrify the C.N.R. From Moncton to Halifax?

By C. H. Mc.L. BURNS.

The electrification of railways has been discussed so often by eminent electrical engineers and prominent railroad men during the past year, and the advantages and disadvantages compared with steam operation have been advanced so often in our leading trade journals and professional publications that it would be little short of presumption for me to attempt to arrive at any decision on the subject. Nevertheless, I wish to draw attention to the advantages which the electrification of the Canadian Government Railways from Moncton to Halifax might yield to the operators of the thin coal beds of the Cumberland district, and incidentally place before the public notice the opportunity which this step would present to conserve the coal resources of the Province.

The engineering phase of this question is an established possibility, beyond all doubt. It is no longer an experiment. The equipment is commercial. All that is required is the power and the money to develop it; the last annual report of the Norfolk and Western Railway testifies to this. The Commission of Conservation, in their ninth annual report, sums the situation up as follows:

"Balancing the pros and cons, it is found that elec-"tric traction materially reduces the operating ex-"penses, but materially increases the fixed charges. "The saving in operating expenses is nearly directly in "proportion to the number of trains per day. The "greater the density of traffic the greater the sav-"ing. The cost of installation is in a great measure "independent of the density of the traffic, or the num-"ber of trains per day. On a road of a given standard, "the cost of many of the items which go to make up "the whole is the same whether the trains be few or "many. The problem thus always resolves itself into "this. With the number of trains per day on a given "section of a road, will the undoubted savings and "operating expenses be sufficient to offset the un-"doubted increase in fixed charges?

"Every division of the road is a separate and inde-"pendent problem."

No doubt generalization is dangerous, especially in connection with the electrification of railways, where so many factors, such as the physical location, character of loads, the power situation, etc., come in to affect the decision if applied locally. But applying it locally the question is this—is the traffic on the Moncton-Halifax divisions sufficiently dense to justify the large expense necessary to the installation of electric traction? Probably under war conditions it was, and possibly facilities for handling might make it so under normal conditions. Halifax is one of the world's greatest ports. In fact it is rivalled by few in the shipping world. On this Continent it is the nearest port to Great Britain and France and should be the gateway to the whole Dominion. The average freighter can save eight days on a return trip across the Atlantic, sailing from Halifax, instead of from Portland, Boston or New York, and about four days over St. John. This fact was of the greatest importance during the war when bottoms were at such a premium, for it meant that a boat on the Halifax route could carry from one quarter to one third more men, food, ammunition and supplies, than can the same boat from any of the American ports. If Halifax can discharge and load that boat with greater efficiency and speed than any other port, it means a still greater saving over the others. But railway transportation and port facilities govern the degree to which this geographical advantage can be utilized, and it goes without saying that with equal facilities for handling and equal port charges, the port with the widest choice of transportation facilities to the interior will be the greatest. New York has grown by leaps and bounds beyond all other ports on this side of the Atlantic because of this universality of railway connection. It competes with Montreal and New Orleans for the freight that should come to them as the natural outlets for the country back of them. The fight for this trade started back in the days of inland water transportation when the Americans built the Erie Canal to divert the Western trade from the Montreal route. Canada tried to come back with the Trent Canal but was forestalled again by the advent of the American Railway. Are we still going to be satisfied with a second place? Why cannot Halifax and not New York handle the flow of grain from the West while Montreal is frozen up? The reason is quite evident. Railway congestion and lack of facilities for storing is driving this traffic into other channels. This is a very serious problem now, but even after this war is settled, when the struggle for the markets of the world will be fierce, any practical expense due to transportation will act as an increased cost of production on our goods. The port problem is important, but it is a railway problem even more than a shipping one. Halifax now has the terminal docks, which will doubtless be equipped with the best facilities for discharging and loading ships in port, but if it is not to be strangled, it must have adequate transportation facilities. The Intercolonial, the National Transcontinental and the C.P.R., all converge to pour the freight of Canada into Moncton, but from here to Halifax this freight must be hauled 186 miles over a single track railway. This 186 miles must be double tracked and some day electrified or electrified now as a more speedy remedy. As to double-tracking the "Canadian Engineer" in an editorial of April 18th, 1918, says:

> "The railways to the American ports are heavily congested. The whole shipping problem on the Atlantic coast would be materially relieved by widening the neck of the Halifax bottle. As to electrification as an alternative, Mr. E. W. Rice, the President of the American Institute of Electrical Engineers, in an address to that body in New York not long ago said: 'I think we can demonstrate that there is no other way known to us by which the railway problem facing the country can be as quickly and as cheaply solved as by electrification.'"

From the foregoing it seems at least reasonable to

* Resident Engineer, Martime Coal Ry. & Power Co., Joggins Mines, N.S.

conclude that the electrification of this section of the Government Railways is justifiable in view of the energetic trade war and keen competition for a share in the world's markets, which will doubtless follow the Great War, as a permanent investment in the commercial life of our country purely from a transportation point of view. Further, and which I wish particularly to point out is the importance of such an undertaking in the conservation of the fuel resources of the Maritime Provinces, which are vital to the commercial and industrial life of the Dominion as a whole.

One of the great advantages claimed for electrification is the saving in coal, when burned in one large, central power plant in comparison with burning it in an inefficient locomotive. But electrification offers this and still greater advantages in the economy of coal through the medium of the central station. When this section of the Government Railways is to be electrified it must be by steam power. A glance at the map will illustrate this. The streams flowing through this part of New Brunswick and Nova Scotia are all short and their watersheds small. Hydro-electric development on a large scale cannot be undertaken between Moncton and Truro at any rate. But if the country has no water power great enough for an enterprise of this magnitude it has unlimited coal resources. The Cumberland Coal field, one of the largest in Nova Scotia, is situated at almost the centre of the Moncton-Truro division, and if the coal is properly conserved, it offers a supply of power more than sufficiently large for such an undertaking, for a great many years to come, probably hundreds of years. Here is another advantage for the central power station. Situated in the centre of the coal field, it will greatly reduce the cost of coal at the plant; power is now being generated by some of the coal companies for at least half a cent per kilowatt hour. This central power station could also distribute power to the industrial centers scattered along the railways, and contiguous thereto. This would eliminate the need for transporting coal to them and give them their necessary power with a much smaller coal consumption, a relief to the overburdened railway, and another step toward true conservation.

In the Cumberland Coal Field there are two areas of productive coal measures, separated by a large tract of newer rocks. One of these is the Springhill area, situated almost in the centre of the country and immediately north of the Cobequid range of mountains. It has an area of approximately 21 sq. miles and is connected with the port of Parrsboro and the main-line of the C.N.R., at Springhill Junction by rail.

The other productive area is the Joggins. It extends from the shores of Chignecto Bay inland some twenty miles to the old Economy Road. Between seventy and eighty seams of coal outcrop along the northern side of a cylindrical basin of carboniferous measures, the axis of which pass through Shulee, about twelve miles south of Joggins, on an east and west direction. The seams dip to the south under newer strata at angles varying from 17 degrees at Joggins to about 50 degrees on the eastern end of the area. The width of the area across the outcrops of the productive strata is about two miles, but as mentioned before, the seams all extend southerly under the newer rocks giving the basin a much greater width. The main line of the C.N.R., between Maccan Junction and Athol, crosses this area about midway between its extreme ends and taps the area on either side by the Joggins Railway on the west and the Chignecto and Fenwick lines on the east.

This Joggins field is unique in comparison with the other coal fields of the province. As they are noted for their thick seams this field is noted for the very large number of thin seams which it possesses. Of the eighty seams exposed only five or six are considered workable at a profit. These range from 2½ to 4 ft. in thickness. Nevertheless, a conservative estimate of the amount of coal in these six seams, as far as they have already been proved, is several billion tons.

Although this field was probably the first in America to be investigated, being mentioned in the "Relations of the Jesuits" as early as 1612, it has not grown in importance as have the other fields of the Province, due alone to the thinness of its seams. When pressed by the Government of Nova Scotia in the early fifties, to do more work on their areas in this district. the old General Mining Assocation complained that they had spent over a hundred thousand dollars and had not realized forty-five thousand. The mistake was that they were trying to apply the same methods of mining to these thin seams that had proved a success in much thicker seams. One company followed another with but indifferent success. None of the mining was deep, one slope after another being opened along the outcrop; long underground hauls with the equipment which they had made the cost of production prohibitive. The result is that this large field has only been scratched along the surface. But in late years the Maritime Coal, Railway & Power Company has come into this field and been pioneers in the profitable working of these thin seams. They now control large areas and by the introduction of machine longwall working, mechanical haulage, underground and universal electrical equipment throughout its mines and surface plants, has succeeded in bringing the cost of production appreciably below the market price of coal. They have proved that with proper methods of working and the economical handling of large outputs, the thin seam can compete favorably with the thick one. There is one drawback, which as yet has not been overcome. The coal has to be "mined" and since the mining is approximately the same for any seam, the percentage of fine coal is much higher in the thin seam than in the thick one, which of course is always harder to market than round coal.

In the early days of coal mining in Cape Breton and before the advent of the steel industry, the disposal of this fine coal became a serious problem, so much so, that at one time it was seriously advocated to use it on the sea beach to evaporate sea water in the production of salt. Now, however, their larger markets and the steel industry absorb it all.

Unfortunately the coal of the Joggins field is not a good coking coal and the fine coal cannot be used for metallurgical purposes. This however is a very strong argument for encouraging the working of these thin seams for steaming purposes now and conserve the large beds of good metallurgical coal to supply the demands of the future. The idea advanced heretofore has been to work the thick beds now at a profit and fall back on the thin ones as a matter of necessity when prices will be higher. This is human nature, but is it sound common sense? If the industrial life of Nova Scotia, which is part of the Dominion is to continue permanently, the coal industry must be maintained for as long a period as possible, and to accomplish this, the thin beds should be worked contemporaneously with the larger beds.

To profitably work these thin seams then, some market must be found for the fine coal, which in a great many cases runs as high as fifty per cent of the

output. Evidently, the only market accessible is for steam purposes. The most obvious method of utilizing a particularily small fuel is to burn it. Here again we strike a snag. Most of the individual steam plants, scattered over the country, and locomotives, are not equipped to economically use fine coal. To do so requires a study of the fuel and furnace designed for it. This, of course, could not be attempted by the plant using a few cars of coal a year. It must be done by the coal operator if he is to dispose of his coal. The only solution of the problem then, seems to be for him to erect and equip such a plant and turn this unmarketable fine coal into a marketable product in the form of electricity.

The Maritime Coal, Railway and Power Company, mentioned before, has taken the first step towards marketing their fine coal as electricity, in fact, they claim to be the first in America to supply power for commercial purposes, direct from the waste coal at the mouth of the pit. On the suggestion of Thomas A. Edison, they erected as an experiment a small power plant at their Chignecto Mine, six miles from the town of Amherst; the experiment has proved a success and the capacity of the plant has been increased gradually until now it supplies practically all the power used by the industries of that town, light for the town, light and power to the Company's mines throughout the district, as well as supplying the country situated along its power lines. But the extent to which the plant will relieve the situation is dependent on the market; that, at present, is not large enough to enable this one company to dispose of all its fine coal. True a power plant can, to some extent, create its own market by offering power at an attractive price and so induce industries to locate in the district, but, in order to make its price attractive it must be efficient, and therefore necessarily of large capacity. Further, to find money for such a venture, the market must be reasonably sure, or in other words market and plant must grow together.

Here is a coal field with an abundance of fuel, and the nucleus of a large power plant, already in operation, on the main line of the C.N.R., from Moncton to Halifax. Why cannot the Government kill two birds with one stone—solve its transportation problem by electrifying and offer the coal operator a market for his fine coal? Why increase mine production and overburden the railway carrying this coal around, depleting our coal fields more rapidly than necessary, when we can conserve the round coal by burning the fine?

IRON AND MANGANESE ORE DEPOSITS IN THE IDARWALD, GERMANY.

(From the British Military Governor, Cologne.)

For the last few months prospecting for iron and manganese has been taking place in the Idarwald, about 50 kilometres south of Coblentz. It was known before the war that there were deposits of iron ore in this region, but with the Lorraine Ironfields in their possession, the Germans did not consider the exploitation of the ore deposits in the Idarwald profitable enough.

The work of the last few months, however, has given very satisfactory results, and it appears that the whole of the Idarwald contains rich ore deposits. Deposits have already been discovered in the regions of Rhaunen-Sulzbach, Weitersbach, and Horbruch (about 20 kilometres W. by S. of Berncastel).

The ore has been discovered at a depth of from 6 to 10 ft., but in several places also just below the surface. Analysis shows that it contains from 55 to 60 per cent metal, and up to 30 per cent manganese. Its transport could be effected at a small cost by means of the Hunsbruck railway.

THE UNITED VERDE COPPER COMPANY, JEROME, ARIZONA.

From an article in the Tucson "Citizen," republished in "Iron Ore" of Ishpeming, Mich., the following particulars regarding the operations of the United Verde Copper Company are extracted.

For stripping the overburden a steam shovel weighing 300 tons is used. The dipper holds eight cubic yards, or rather more than ten tons, and the radius of the shovel's operation will permit of opening up a cut 140 feet wide. This shovel is shifting 175,000 yds. of rock monthly.

At the United Verde smelter at Clarkdale, a powdered coal plant is being finished. This plant will have a capacity of 500 tons of pulverized coal per day and will supply fuel to five reverbatory furnaces.

A coal storage and reclaiming plant has recently been completed. It will store 14,000 tons of coal, 12,000 tons of which can be stored under water. When the stored coal is required it is conveyed from the water-bunkers to the drying plant by a belt conveyor, and after drying, by a system of screw conveyors, the coal is taken to the pulverizers where it is ground to 200 mesh. It is expected that the use of powdered coal will show an economy over fuel oil now used.

A Cottrell smoke treater is approaching completion. The plans of the company contemplate an expenditure of a million dollars on treatment of the fumes, dust collection and recovery of copper which now goes to waste in the dust.

Large use is being made of concrete in the underground work. A stretch of tunnel reaching from the portal for 3,600 feet in the main tunnel has been treated with a concrete gun. Another tunnel section 950 feet in length is being entirely concreted because of the nature of the ground.

Especial attention is being devoted to the well-being and comfort of the employees.

PERSONALS.

Mr. Jas. McEvoy has returned to Toronto after examing iron deposits in the Belcher Islands, James Bay. He made the trip north in 15 days and the return trip in 20 days. He was accompanied by Mr. Sainsbury, one of the owners of the properties.

Mr. J. B. Tyrrell who has been examining gold properties in Rice Lake district, Manitoba, has been detained by the early freeze up.

Dr. W. G. Miller, Canada's representative on the board of the Imperial Mineral Resources Bureau, has returned to Toronto after several months' absence in connection with the work of the Bureau.

Mr. R. E. Hore has returned to Toronto after examining properties in the Shiningtree gold district and will leave shortly to make an examination in the Rice Lake gold district, Manitoba.

Some Elements of Economy in Air Compression

By WM. CARTER, A.M., A.S.M.E.

(Continued from page 809, issue of October 29th.)

But even under the best conditions water jacketing realizes only a part of the saving which its theory promises. Some beneficial effect in this respect it certainly has, particularly in slow speed, long-stroke machines. But probably its greatest value lies in its effect upon the lubrication and the resultant wearing qualities of the machine. Compression at sea level and ordinary atmospheric temperature to only 75 lbs. gage produces a temperature of about 400 degrees Fahr. If some means were not employed to reduce this temperature, the inevitable result would be destruction of all ordinary lubricants and packings, and the rapid wear of piston rings, cylinders, rods and valves, with extravagant leakage, loss of capacity, increased friction and excessive power consumption. But the water jacket keeps all parts reasonably cool and results in tight joints, free lubrication, little wear, reduced friction, easy running, and sustained capacity and efficiency.

It is perhaps unnecessary to say that it is almost as important that air should be admitted into the cylinder cool as that it should be kept cool during compression. If a water jacket were not used the entering air would be heated while passing through the hot valves and ports and by contact with the heated interior of the cylinder. This would mean the rarification of the intake air, reduced cylinder capacity, lower efficiency of compression and excessive terminal temperature. Since jacketing is at the best only partially effective, this latter argument suggests the advantage of those constructions which admit air through one or at least only a few large openings where only the outer film of the air is heated rather than through a number of smaller openings through which the air is finely sub-divided and heated.

The second process of cooling—compression in stages—is analagous to an arrangement in which the compressing piston of a single cylinder is stopped at intervals through its stroke and the partially compressed and heated air is withdrawn and cooled by some external means to its initial temperature or even lower; then returned to the cylinder to be further compressed, heated and cooled until the desired pressure is reached. It is evident that such an arrangement would maintain a fairly uniform low temperature in the air volume throughout the stroke, giving very close to isothermal compression.

Such a proceeding is evidently not practical. But the same results may be obtained by compressing in several cylinders, in the first of which moderate pressure and temperature are reached and the air in this condition discharged through a cooling device which restores its initial temperature; then admitted to another cylinder for further compression and heating; again withdrawn and cooled and again compressed. This is a stage or compound compression. An average of the practice of the leading builders permits single stage compression for pressures up to 70 pounds or under some conditions to 100 pounds; two stage compression for pressures of 75 to 500 lbs., three or four stage (preferably in duplex compressors) for pressures of 500 to 1,500 lbs., and four stage compression for pressures from 1,500 lbs. up.

A three stage straight line machine should only be used for small or moderate capacities. Above this, the duplex type should be preferred because of its balanced construction and of the readiness with which it is compounded.

The primary object of compound compression is a saving of the power required by what may be called the heat element in compression. The degree to which this is accomplished depends entirely upon the efficiency of the intercooler. The ideal intercooler would be one which would reduce the temperature of the air to the temperature of the cooling water. This probably cannot be realized, but a good practical standard demands that the intercooler shall deliver air at a temperature not more than ten degrees above that of the cooling water.

The successful intercooler involves six fundamental requirements. It must provide for a complete and minute subdivision of the air passing through it, that the heat may be dissipated without any dependence upon the best-conducting qualities of the air itself. The air should be split up into thin sheets or streams so as to dissipate its internal heat. There must be an ample cooling surface presented to this subdivided air stream. The circulation of the cooling water must be properly directed in relation to the flow of the air, and its velocity must be such that the maximum amount of heat will be carried away without waste of water. All air passages must have ample cross section, that the velocity of air may be such as to give a length of contact with the cooling surfaces sufficient for the complete removal of the heat. Expansion and contraction must be provided for that there will not be a leakage of air or of water. Suitable means must be provided for removing from the intercooler the moisture condensed from the air in the cooling process.

Compound air compression has important bearings upon other features of compression economy. It reduces the average structural stresses, resulting in a higher factor of safety and a longer life for the machine with a given weight of metal. The maximum stresses encountered in compression in two stages are only 55 or 60 per cent of what they are in single stage compression to the same pressure. The reduction of stresses here referred to is felt not only in the machine structure but in the air valves, which show a notably easy operation under compound conditions. Another advantage of compound compression is an improved steam economy if the compressor is steam driven. The averaging of the stresses throughout the stroke, permits the work to be done with a lower M.E.P. in the steam cylinder, which means a shorter cut-off and a greater steam economy. The reduced terminal stresses permit a higher piston speed with safety, thus improving the steam economy by reducing condensation losses and leakage in the steam cylinder.

Higher volumetric efficiency results from compound compression, coming from three sources. The first of these is the fact that the clearance pressure in the intake cylinder is lower. The second is a lower maximum temperature in the cylinders so that the entering air is not so much heated. The third is a reduction of leakage consequent upon the reduced extremes of pressure in each cylinder. Compound compression results in more efficient lubrication of the machine be-

cause of the lower temperatures involved. This means easier running, improved mechanical efficiency, less wear, lower repair costs, reduced leakage losses, and longer life. Compression in stages results in the delivery of drier air—a feature of great importance where the air is used under conditions which may result in freezing up at the exhaust ports. This also largely obviates the accumulation of water in pipe lines.

The air valves of a compressor are probably the most vital parts of a machine. While the number of different types of air valves is greater than the number of compressor builders, yet they may be broadly classified into two groups. Mechanically actuated valves have a positive motion derived through some mechanical connection from the rotating or reciprocating parts of the compressor. Poppet or automatic valves are operated wholly by differences of pressure. There are some air valves in use today which cannot be exactly placed in either class. Notable among these is the "Hurricane-inlet" or "Piston-inlet" of one of the large builders which is operated by its own inertia. In other cases a valve may seem to combine the features of both classes, an automatic adjustability supplementing a primary mechanical control.

Without going into a detailed discussion of the many different types of air inlet valves, some general observations may be made as to their function and requirements. The function of an inlet valve is to admit the maximum volume of cool, clean air to the cylinder with the least expenditure of power; to keep this air in; and to continue to perform this duty indefinitely at the least total cost. Analysis of this function reveals the following requirements of the successful inlet valve.

It must admit a volume of air which will entirely fill the cylinder, this air being as nearly as possible at atmospheric pressure. This calls for an instantaneous and complete opening of the valve, so timed that there shall be no escape of the compressed air in the clearance space. This full opening should be held to the end of the stroke, and short, direct and unobstructed passages should be provided through ports and valves.

It must admit clean air, suggesting a design permitting ready connection to an intake passage or conduit leading to a place free from dust and grit. The air admitted must be as cool as possible—a condition partially met by the consideration just mentioned by which cool air as well as clean air should be supplied. But, more than this, the cool air supplied should nowhere be heated in its course into the cylinder, suggesting that valves, ports and passages shall be so placed as to be cooled by the cylinder jacket. Moreover the air should be admitted through one or a few large openings rather than sieved through many small ones.

All the air admitted must be kept in the cylinder, calling for instantaneous and complete closing of the valve at the end of the stroke, with a perfect seating and without any leakage. All the processes outlined here must be carried on with the least possible expenditure of power for the overcoming of friction and the manipulation of the valve gear—a requisite demanding nice adjustment, simplicity of mechanism, perfect lubrication and as few wearing surfaces as possible. This exacting performance must be continued indefinitely, twice each revolution and hundreds of times per minute without undue wear or loss of adjustment. This condition is fundamentally one of correct design, high class materials and workmanship, and generous lubrication.

The ideal inlet valve is here outlined. Probably no compressor valve on the market today exactly fulfills all of these conditions; but many types represent the experienced judgment of the builders applied in an excellent compromise.

The functions of an air discharge valve are to release the full volume of compressed air from the cylinder with the least friction and power expenditure; to keep it all out after discharge, and to continue indefinitely to maintain this duty without undue expense. The primary essentials of such a valve are as follows:

Its opening must be full and instantaneous, must occur just at the right point in the stroke and must be held until the piston comes to rest. The valve opening must be ample so that the velocity of discharge may not be excessive and the ports and discharge passages should be short and free from obstruction, to reduce friction.

As few parts as possible, and these correctly adjusted, should provide for the necessary valve movement with the minimum loss of power in mechanical friction.

The valve should close instantly and completely as soon as the piston stops, that there may be no return of the air discharged when the piston starts on its back stroke. Such a return of compressed air would have the effect of an increased clearance, reducing the capacity of the cylinder.

The continued maintenance of this performance (which is more arduous upon the discharge valves than upon the inlet valves because of the higher pressures) suggests the advisability of a simple construction with the fewest bearings, careful workmanship, the use of good materials, perfect lubrication and careful distribution of materials. It is always to be remembered that discharge valves and ports are continually exposed to a flow of heated air even where jacketing is most complete. On the other hand, an essential of inlet valves and ports is that they shall be kept cool. The latter should therefore be removed as far as possible from the former, nor should the same ports be used for both inlet and outlet.

It might at first glance, seem that the area of the discharge valves, ports and passages could be much less than the corresponding inlet area, since the former must pass the air at a higher pressure and in less volume than the latter. But it is to be remembered that while the inlet areas are open during the full stroke, the discharge areas are open for only a part of the stroke—about one-third. In order, therefore, to make the velocity of discharge about the same as that of intake or admission, it is usual to make the inlet and discharge areas approximately equal.

It is important that the velocity of flow through the valves, ports and passages shall be not excessive, and this depends upon the piston speed which is a widely variable quantity. The higher the piston speed, the larger should be the area. In actual practice, the inlet areas vary from 3 to 15 per cent of the cylinder areas, with an average probably around 9 to 10 per cent. The corresponding discharge areas from 7 to 15 per cent, with an average in the neighborhood of 10 to 12 per cent. The larger these areas, the better the economy.

Owing to the increased friction through a number of small passages as compared with that through a single

large one, the actual measured area in the former case should be 50 to 100 per cent larger than the latter. This explains why the measured inlet area of machines with Corliss or other large area inlet valves is often so much less than the measured discharge area of many small poppet discharge valves, while still giving good results.

It may we well to recall at this point that cylinder clearance is really made up of three elements: the inlet port clearance, which is all the space left between the closed inlet valves and the inner surface of the cylinder, the discharge port clearance, which is the corresponding space in the discharge passage, and the piston clearance, which is the space allowed for safety between piston and cylinder head at the end of the stroke. This latter element is an essential in compressors. But it is not unusual for the other two elements together to constitute by far the larger proportion of the total clearance. This suggests the superiority of those valve designs in which inlet and discharge port clearance are reduced to the lowest practical limit.

Coming now to consideration of the third element in air compression, the mechanical structure, we find that it has a very important bearing upon the economy and the endurance of the machine.

The mechanical efficiency of a compressor can be exactly determined by a comparison of the steam and air indicator cards (in a steam driven machine) or by a comparison of the measured power applied to the horse power of the air indicator card (in a power driven machine). The difference between these values represents the power consumed in the fricton of the compressor. Good mechanical efficiency, therefore, depends upon the extent to which friction is reduced. There is no time here to enter into the details of compressor design, it will be enough to enumerate some points having a vital bearing on this subject.

Power should be applied to resistance—steam pressure to air pressure—in as direct a manner as possible, so that bending or deflecting strains may be avoided as far as possible, with the resultant binding of bearings and loss of correct alignment.

Ample metal should be used, properly disposed to afford the rigidity necessary as a further precaution against the attendant binding stresses just mentioned. A light construction is always to be avoided.

Lest this correct proportioning of materials to meet stresses should result in an excessive weight and an extravagant cost, these materials should be of the best quality and intelligently selected for specific purposes, affording the maximum strength per unit of weight.

All bearings should be of ample area, so proportioned as to give a safe, moderate pressure per inch of bearing surface.

Wherever possible, bearings should be supplied with removable linings (preferably of anti-friction metal). In all cases, whether thus lined or otherwise, they should be scraped smooth and true, properly adjusted and arranged for the ready distribution of lubricant—all of this tending toward a lower coefficient of friction for these bearing surfaces.

Complete provision should be made for a plentiful supply of lubricant to all bearing surfaces, furnished preferably by an automatic system which will be efficient at all speeds.

The utmost simplicity should be sought throughout, reducing the number of parts, the number of joints, (each an element of weakness) and the number of bearings, with their attendent friction and their possible loss of economical adjustment.

The design should afford a ready accessibility at every point, inviting frequent and careful attention to the maintaining of a correct adjustment of all parts for most efficient operation.

Steam compounding and compound air compression have important effects upon the mechanical efficiency, which have already been discussed in the proper place.

Friction has been aptly defined as "that portion of the power consumed by a machine in wearing itself out." This definition throws on the question of compressor endurance a light in which the importance of a high mechanical efficiency appears in bold relief. True economy is a question, not of momentary results, but of results covering months and years of continuous service under all conditions: and a compressor in which the percentage of "wearing out power" is least promises not only the highest, but also the longest, record of sustained economy and satisfactory service.

While the regulating devices or governors used on air compressors vary in detail among the different builders, all may be divided so far as the principle of operation is concerned, into two classes.

The first class is that applied to compressors with plain or adjustable cut-off valves of flat or piston type. It operates by throttling the steam supply as load diminishes. Devices in this class consist fundamentally of a valve in the steam pipe, which is opened or closed by action of a piston in a cylinder, this piston being actuated by air pressure from the receiver. The movement of this piston is opposed by weights on a lever or by a spring, and the spring tension or the weights may be adjusted so that the governor valve is full open at any desired normal air pressure. But when pressure exceeds this limit, the tension of weight is overcome, and the valve in the steam supply is closed in a degree corresponding with the amount of excess pressure. This slows down the machine and reduces the volumne of air discharged until such time as the normal pressure is reached, when the weights or spring tension again open the governor valve, and full speed is restored.

The second class includes governors applied to machines with Corliss steam valves. The mechanism consists of a pressure cylinder and piston with opposing weights or springs as described in the preceding paragraph, but in this case the movement of the governor, instead of throttling the steam, changes the cut-off of the steam valves, reducing speed under partial load, and restoring it as load increases. The resistance per stroke being the same throughout a very slight change of cut-off hardly effecting the economy, produces all the speed change necessary.

Both of these classes of governors include also a speed-limiting device, the more common form being the familiar fly-ball arrangement, which throttles the steam supply or greatly shortens the cut-off when speed exceeds a certain limit, as it might in case an air pipe should break or other accident occur.

There are occasional instances in which governors of one or other of the above classes are used in connection with a unloader on the air end, so arranged that, as speed falls off, the load is partially taken from the air end. These are the specialities of individual builders, and as such cannot be elaborated upon here. The two general classes defined cover the general requirements of this paper.

Since the power driven compressor is almost always a constant speed machine, the methods of regulation and governing described for variable speed steam driven machines evidently cannot here be applied. Con-

stant speed means constant piston displacement, and the problem of delivering a variable volume of air with constant piston displacement, becomes one of making a portion of that displacement non-effective in the compression and delivery of air. Only the fundamental principles of several methods of accomplishing this will here be discussed.

The first method is really one of unloading, rather than of regulating. A pressure controlled mechanism is arranged so that when pressure exceeds normal, due to excess of delivered volume over demand, a communication is opened between the two sides of the compressing piston. Usually this is accomplished by opening and holding open one or several of the discharge valves at both ends of the cylinder, the air then simply sweeping back and forth from one side of the piston to the other through the open valves and the air discharge passage. When normal pressure is restored, the valves are automatically closed, and compression and delivery are resumed. Evidently this is practically a total unloading of the machine for a longer or shorter period—a sudden release from load and a sudden resumption of load. Moreover, the air which is swept back and forth by the piston in its travel is air under full pressure, so that when the discharge valves suddenly close, the piston at once encounters a full cylinder of air at maximum pressure. These facts limit regulators of this class to machines of comparatively small capacity.

Another method provides, by means of a pressure operated device, for the partial or total closing of the compressor intake under reduced load. To avoid the dangers attendant upon such an operation acting suddenly, these devices are provided with some damping mechanism so that they are compelled to operate slowly, making the release or resumption of the load gradual. The cutting down of the air intake results in a rarification of the air entering the cylinder, and a greater range between initial and discharge pressures, with a corresponding increase in the range of temperatures. This method of regulation, therefore, is not suitable for very great load variations; nor is it recommended for such conditions by the builders responsible for it.

The third method is very similar to the first, except that here the inlet valves, instead of the discharge valves, are held open when the machine is unloaded, the piston thus simply drawing in and forcing out air at atmospheric pressure. It is open to the same criticism (though in somewhat less degree) as the first method namely, undue shock and strain on release and resumption of load.

The fourth method uses a pressure-controlled valve on the compressor discharge of single stage machine, combining also the functions of a check valve to limit the escape of air from the receiver of air line. Excessive pressure blows the discharge to atmosphere, instead of into the line. This arrangement is also used on two stage machines by placing it on the low pressure discharge to the intercooler. Then, when the governor valve is opened by excess pressure, the low pressure cylinder discharges to atmosphere, and the high pressure cylinder acts simply as a low pressure cylinder with intake at atmospheric pressure. This device is more of a relief valve than an unloader, for the piston must continue to compress to a pressure which will open the discharge valves, and this volume of compressed air, with its power equivalent, is wasted.

Yet another method of regulation provides auxiliary clearance spaces, or pockets, at each end of the cylinder, which are successively "cut-in" as load diminishes. The excess air is simply compressed into these clearance spaces and expanded on the back stroke. The capacity of the cylinder is reduced without any appreciable waste of power, for the energy used in compressing the clearance air is given back by its expansion.

On power driven compressors with Corliss intake valves, several different methods of unloading or regulating are used.

By one method, the Corliss valve is held open for the full admission stroke, and also for a part of the compression stroke, this latter portion being determined by the unloading called for. Evidently this is practically equivalent to a shortening of the stroke of the compressor.

By another method the Corliss intake valve is opened full at beginning of admission, but closes later in the admission stroke. The air admitted to that point is expanded or rarefied for the remainder of the compression stroke, and then compressed, the volume of compressed air delivered being of course reduced. This arrangement is productive of an excessive temperature range in the cylinder. Still a third method opens and holds open the intake valves at the end of the cylinder, or at opposite ends in duplex machines. The effect of this is to make ineffective one out of every two strokes. If still further unloading is necessary, the intake valves at the other end of the cylinder or cylinders are opened and held open. The three arrangements just outlined all operate by a pressure controlled mechanism which actuates some form of trip on the Corliss air valve gear, somewhat similar to the release mechanism of the Corliss steam valve for varying the cut-off.

Three things are to be avoided in the successful unloader or regulator for power driven machines. first, a sudden release or resumption of load, throwing heavy strains on the machine; second, undue rarefaction of the intake air, resulting in a wide range of cylinder pressures and temperatures; third, the blowing-off of compressed air to the atmosphere with a waste of power.

In the regulation of the power driven compressor, less reliance must be placed upon the automatic regulation of the individual machine than upon the intelligent subdivision of the load between two or more machines and upon the careful management of the resulting plant. In designing a plant of these machines, maximum capacity must be cared for in the normal output of the machines, while partial loads are provided for by starting or stopping one or more machines, the remainder running at or very near full load. It is usually desirable to start a power driven compressor with no load, throwing on the load gradually after normal speed has been reached. This is in fact essential in machines driven by electric motors, for the heavy inrush of current in starting under load is dangerous, particularly where power is taken from a transmission circuit supplying other motors.

Evidently almost any of the unloading devices noted in the previous section can be used for this purpose if properly arranged for manipulation. The usual form, however, is simply a by-pass valve to atmosphere on the line close to the compressor protected by a check valve between it and the receiver to prevent the return of air from the line when the starting unloader valve

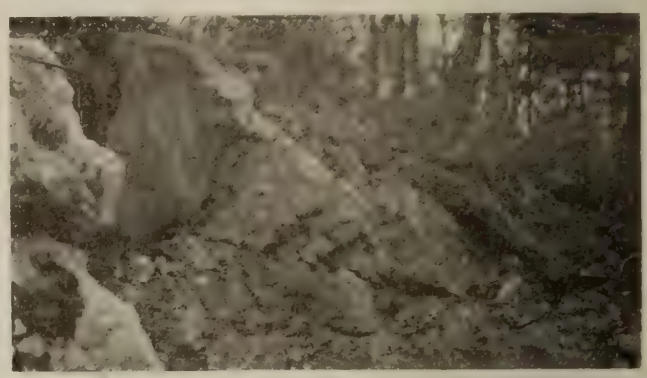
Continued on page 831.

The Pitchblende Deposit in Butte Township, Nipissing District, Ontario

By REGINALD E. HORE.

During the past few weeks there has been much interest shown by prospectors in the radium ore discovery made by Wm. Elliott in Butt township. The accompanying photographs will give readers of The Journal some idea of the nature of the country in which the pitchblende has been found. Mr. C. W. Knight of the Ontario Bureau of Mines has briefly described the deposit in the Oct. 15 number of The Journal. The photographs will supplement his description.

The Elliott Pitchblende Deposit, Close View.



The Barber Mica Deposit, Butt Township.

Since Mr. Knight visited the property there have been many claims staked in Butt township. There has been a search for pegmatite dykes that would astonish the resident of the Parry Sound and Muskoka districts, as it would those who have been prospecting for gold and silver. Pegmatite dykes are abundant in most areas of the old crystalline schists. Yet in Butt township where they are most in demand very few are exposed. The rocks in which the pegmatite occurs are ordinarily of little interest to the prospector in Ontario, for they are granite and diorite gneisses. Mr. Elliott's discovery, therefore, will lend new interest to these formations and possibly result in further important discoveries being made in areas that have hitherto been considered as unpromising.

The Elliott Pitchblende Deposit, General View.

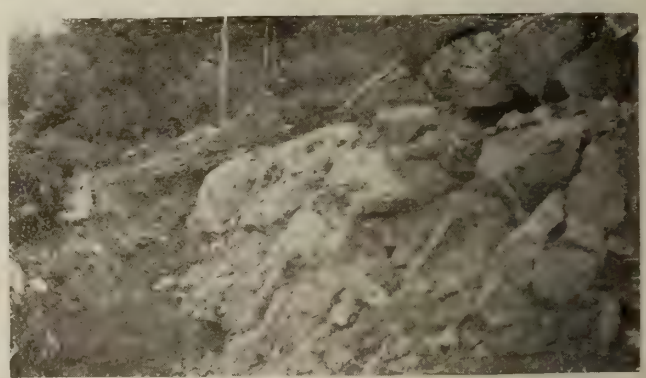
The Elliott discovery was made while developing a pegmatite dyke which contains an abundance of mica. The exposure is at the edge of a little peninsula in Mica Lake. The dyke is probably a big one, but very little of it can be seen. Only the footwall portion has been exposed and that only for about 40 ft. The photographs help to show why so little is yet known about the extent of the deposit.

In the dyke there are numerous muscovite mica crystals three or four inches in diameter. Thin leaves of this mica are nearly colorless and clearly transparent, but show numerous inclusions of green, red and black minerals. The crystals derive from the inclusions a brownish color.

In addition to the transparent muscovite mica there are also present crystals of black opaque biotite.

The feldspar crystals that form a great part of the pegmatite are plagioclase feldspars of red, flesh, and greyish white color. Some of the nearly white feldspars at the edge of the dyke show very distinct plagioclase striations. The red feldspars have also these characteristic striations. Some of the large crystals are partly red and partly white.

The quartz in the pegmatite is in part nearly colorless, but some is very dark colored—smoky quartz.



Another View of the Elliott Deposit.

The pitchblende, which is a heavy mineral and should be readily recovered by ordinary concentration methods, occurs in shapeless grains. Its name suggests its appearance, for it is a black mineral with a lustre resembling that of asphaltum. It is fairly hard and of high specific gravity. It occurs chiefly in the red feldspar, but not in all cases. The grains I have seen are nearly all in the red feldspar. In one case I noticed the characteristic weathering product, a yellowish powder which is probably uranium oxide.

Pitchblende is an amorphous variety of uraninite which is a uranate containing lead and rare metals of the lanthanum and yttrium group. It is distinguishable from most of the common black minerals by its high specific gravity and lack of crystalline structure and by the pitchy lustre. According to Brush it is soluble in dilute sulphuric acid with slight evolution of a gas (helium).

The rock which forms the footwall of the Elliott pitchblende deposit is a dark grey crystalline rock in which the most notable mineral is biotite or black mica. There is also an abundance of quartz and a white feldspar. The crystals are about the size of ordinary granulated sugar. Weathered portions of the rock close to the dyke are very friable—easily broken in the fingers.

The method of separating radium from uranium is described in Bull. 104 of the U. S. Bureau of Mines. Radium is used chiefly by the medical profession, the emanations having been found to have the power of curing various diseases. The chief source of radium in America is the carnotite deposits at and near Placerville, Colorado.

PORT ARTHUR NOTES.

(By J. J. O'Connor.)

The romance of a Chicago wholesale merchant finds its settling in the gold regions of Northern Ontario.

Last year Mr. Robert Wachman of 4439 South Michigan Boulevard, Chicago, Ill., came to Dryden, Ontario, to spend his vacation in fishing, hunting and boating. Falling in with an old prospector named Gus Larssen, Mr. Wachman rapidly became inoculated with the mining fever. He lost no time, first in formulating a comprehensive plan of campaign, and second, in beginning intensive work.

Having acquired 2,100 acres of mineral lands at Contact Bay, Vermillion Lake, and formed the Wachman Mining Co., Ltd., with a paid up cash capital of $500,000. Mr. Wachman started to make things move.

The company's lands are reached over a government road, and lie six miles south of Dryden, on the Canadian Pacific Railway. The main vein shows spectacular specimens of native gold over 400 feet of its extent, whilst the vein has been traced for 2,640 feet on the Wachman land, and runs to the adjoining territory of the Rogon Mining Co. Several subsidiary veins, carrying native gold, have also been discovered. On the Rogon property, the vein enlarges from a few inches on the surface, to a width of 12 feet at the 100 foot level.

On the Wachman property, the vein widens from 6 inches at the surface, to 3 feet, at a depth of 15 feet. At this depth a 6-inch paystreak shows, and a series of stringers encountered in sinking, consolidated to form the vein. The gold is free milling, carrying a large percentage of silver. A mining representative of the "Winnipeg Tribune" affirms that average assay values of $700 per ton were obtained by him.

Sixty men are at present employed in building camps and sinking. It is proposed during the winter to sink three shafts, each to a depth of 800 feet. Diamond drilling will be consistently pushed.

A complete 20 stamp mill, with all necessary power, crushing and handling equipment has been purchased, and will soon be installed. The contractor in charge of erection of the mill will receive a bonus of $1,000 if he has steam up on May 1st, 1920.

All ore assays so far obtained indicate a present high average. Ore will be supplied to the mill from four contiguous claims.

One pleasant feature of the situation is that Mr. Wachman's Company has no stock, or securities of any kind for sale. The unique policy of setting aside a large amount of money ($20,000) for distribution amongst employees after three months' service, has been adopted.

The head office of the company is located at Dryden, Ontario, where Mr. Wachman will be pleased to answer all inquiries, or refer them to the "Winnipeg Tribune," Winnipeg, Manitoba.

Incidentally, Mr. Wachman is a native of Courland, and was educated in Dublin, Ireland, and has spent his business life in the United States and Canada.

The Nicholls Chemical Co. are about to commence the construction of an ore dock on the Mission River, just east of the Canadian National freight sheds at Fort William, for the purpose of handling their pyrites ore from the Northern Pyrites Mine, at North Pines, Ontario, and also from their pyrites property at Mokoman, about 30 miles west of Port Arthur. This dock will cost $100,000, and be ready for operation in the spring of 1920. It will afford facilities for the shipment of local iron ore.

Col. Milton Francis manager of the Port Arthur Fort William Development Association is in correspondence with Mr. Bradley Stoughton, Secretary of the American Institute of Mining Engineers, in regard to a proposed visit of the members of the Institute to Port Arthur, in September 1920.

He is also in correspondence with Mr. H. Mortimer Lamb, Secretary of the Canadian Mining Institute, regarding the selection of Port Arthur for the annual meeting of the Institute, to be held during the frst week of March 1920.

One of the syndicate that owns the Czone Siding, zinc ore property, situated about 70 miles east of Port Arthur, on the line of the Canadian Pacific Railway, has recently visited New York, conducting negotiations for the sale of their property. The ore body has been traced for more than a mile. It is essentially a rich pegmatitic segregation in granite. It consists of from 2 to 3 feet of very spectacular zinc blende, adjoining, and surrounding which, are from ten to twelve feet of lower grade ore.

The chief workings are on an exposure which shows strongly on both sides of a creek bed, the vein has been trenched at various points on its length for over a mile. The owners are Messrs. Lawrence and Rochon of Fort William, and Dr. R. J. Manion M.P. of Fort William.

Some Elements of Economy in Air Compression.

Concluded from page 829.

is open. This check valve is essential where several compressors serve one line, permitting cutting in or out any machine without unloading the others. This by-pass valve is opened on starting, when the compressor simply compresses to a pressure sufficient to open its discharge valves, this air escaping to atmosphere. When normal speed is reached the by-pass or unloading valve is gradually closed and load resumed. On two stage machines, an unloader valve should be provided on the low pressure discharge of the inter cooler, as well as on the high pressure discharge to the line. In the latter case, both cylinders operate momentarily as low pressure cylinders.

Our Northern Ontario Letter

The Silver Mines.

Cobalt mining companies are selling silver at the highest figure in their history. Dispatches from London declare that quotations have reached a higher point than ever before. Metal authorities point out that the demand is without precedent. Producers have figures to show that the world output of silver is declining. As a natural consequence the situation is plainly beneficial to the producers.

While the silver currency of the British Isles is being threatened with the possibility of being relegated to the melting pot, and while small silver coins appear to have disappeared almost entirely in Old France, each constituting a source of anxiety among the financial experts of these two great nations, the silver mines of the world are reaping the benefit, and, in the case of Cobalt with its world-famed high grade silver deposits, are speeding up operations to the maximum capacity in an effort to take full advantage of this greatest opportunity so far in their history.

On October 31st the Coniagas Mines closed its fiscal year. It will probably be a month or so before the annual statement can be prepared. In the meantime it is learned that production exceeded three-quarters of a million ounces and that ore reserves are from two to three years ahead of mill requirements based on the present capacity as well as silver at a point above $1 an ounce.

The Mining Corporation is stated to be negotiating with a view to, if possible, acquiring the Thompson-Krist property at Porcupine. At the time of writing, no official statement has as yet been issued.

The Trethewey-Cobalt Company will hold its annual meeting Friday, Nov. 7, in Toronto at which time the question of acquiring additional prospective mining property in the Gowganda district will be brought up for consideration. It will be recalled that the Trethewey, when optioning the Castle a year or so ago, optioned only 51 per cent of the 1,500,000 shares. The annual meeting will deal with this matter and the cancellation of certain agreements pertaining to the minority interest will take place. Among the new properties mentioned as likely to come up for consideration is the Major claim as well as a lease of 112 acres lying under Miller Lake.

According to advice received from Texas, drilling on the oil lands of the Nipissing Mining Company has attained a depth of about 2,200 feet. As yet oil has not been encountered, but officials of the company appear to entertain hope of success. The zone in which oil has been encountered in the vicinity of the Nipissing holdings, ranges from a depth of from 1,700 to 4,000 feet.

Work being done on the Nipissing Extension property is meeting with satisfactory results. A second vein containing high grade ore has been opened up on surface. It has been found to measure about one inch in width and has been opened up for about 60 feet in length. Major Birkett is in charge of operations.

According to unofficial reports, the Buffalo Mines and the Temiskaming Mining Company have been negotiating with the object in view of the Temiskaming taking over the Buffalo. Officials of the latter company declined to make a statement this week regarding the matter.

High grade ore has been encountered on the old Silver Cliff Mine, being operated under lease by the Northern Customs Company. During the past month it is learned that considerable ore has been taken out of the Silver Cliff. The Northern Customs lease has to do only with that part of the property lying between surface and a depth of 500 feet. Below the latter point the Colonial Company is part owner.

In the outlying silver districts, the Gowganda field is easily the most active, especially in the vicinity of the Miller Lake-O'Brien. A good deal of activity is also taking place in the Leroy Lake section of the Gowganda field. The Camburn Silver Mines at the head of which is identified Messrs. Campbell and Fairburn, former leaseholders of the Foster Mine at Cobalt, is exploiting the old Leroy Lake property, and prospects are stated to be encouraging. Other properties on which exploration work is being done are the Collins and the McDonald. On the former a small steam plant is in operation and a shaft has been driven to a depth of about 170 feet.

The White Reserve Mine in the Maple Mountain section of the Elk Lake district continues to attract attention as a result of the high grade ore recently encountered there. Arrangements have been made to send out a shipment of ore during the coming winter.

In the South Lorrain area, activity has reached almost low ebb, the Keeley Mine having been closed down for the winter, and leaving the Pittsburg-Lorrain the sole operating property in that once active district. It would now appear that the anticipated revival of activity in South-Lorrain as a result of the high quotations for silver will at least not materialize until next summer.

The Gold Mining Area.

In the gold mining districts of Northern Ontario the shortage of unskilled labor continues to be a perplexing problem. The peculiar part of the situation is the fact that the shortage is greatest in the larger centres of activity. For instance, in Porcupine there is at present a shortage of close to 2,000 men, while at Kirkland Lake the mines are experiencing very little difficulty in securing large enough forces to fill all vacancies. When the time comes to fully man the mines in the Kirkland Lake field, it is feared more difficulty may be encountered. At present working forces are about one-quarter of the number before the strike was called in June. In the other mining districts. such as Boston Creek, Larder Lake, Bourke's and Fort Matachewan, no serious difficulty is felt in procuring the desired number of men, although in all districts the shortage is more or less felt.

In the Porcupine district mechanical muckers are being tried out, and good hopes are entertained that this may offset the unskilled labor scarcity to at least some extent. As to this, only the future will decide.

The Dome Mines is said to be treating around 1,000 tons of ore daily with about 300 men on the pay-roll, or an average of over three tons per day per man. Compared with this, the Hollinger and the McIntyre are able to handle only about fifty per cent of this tonnage, or between 1½ and 2 tons daily per man. Mining men are pointing to the Dome's achievement as an assurance that costs are being maintained well within bounds and that the president will probably be able to make good his promise to pay a dividend within the next two months.

The Clifton-Porcupine is being aggressively developed, and it is officially stated that a substantial amount of commercial ore has been put in sight.

The Gold Centre Mining Company has decided to explore their Boyce property by use of a diamond drill and arrangements are being made to do from 3,000 to 5,000 feet of core-drilling.

The McIntyre-Porcupine Company is reported to have acquired a working option on the property of the Martin Gold Mining Company, situated in the Harricana River district, near Amos, Que.

Among the mining companies subscribing in a big way to the Victory Loan, 1919, are the Hollinger and the Mining Corporation, the former taking $1,750,000 and the latter $1,000,000.

According to official advice to your correspondent, the Tough-Oakes Mines will remain closed until March, this decision having been reached at a recent meeting. It is believed by that time the economic situation will have improved, the problem of heating the large plant during the winter months will not have to be met.

The Lake Shore, Teck-Hughes and Kirkland Lake Gold Mines are all three making steady progress in their effort to get back to normal rate of operation. A number of the smaller properties are also getting under way, including the Canadian-Kirkland which property is under option to the Crown Reserve.

It is stated in usually well-informed circles that the firm of Hamilton S. Wills still entertains hope of being able to secure control of the property of the Orr Gold Mines. It will be recalled that the latter was for two years under option to the Kirkland-Porphyry, which company recently went into voluntary liquidation, and with which company was identified the Will's firm. Reports, therefore, are conflicting for the reason that only a few days ago it was intimated that the Teck-Hughes Mining Company appeared to have fair prospects of being able to secure the Orr.

At Boston Creek, the Miller Independence Mines announce that they will build a road from the station to the mine. The new highway is to be graded and be sixteen feet in width. It is an interesting fact that the retiring Ontario government promised to construct a road for the benefit of the mining properties in the Boston Creek district, but that such a promise will now rest with others. The neglect of the government to assist in past years in road-building in the Boston Creek district is pointed to as a glaring instance, and it is quite unfair that a private enterprise should be compelled to construct a highway which the general public makes use of.

According to an oficial statement just received, aggressive development work will be carried on at the Boston-Creek property. It is stated that eighteen men are at present employed, and that sinking operations are underway. The shaft which is down 40 feet will be continued to a depth of 100 feet. As to the diamond drill campaign, the official statement says:

"The north fractured zone is being core-drilled for the purpose of exploring the altered basalt at depth. At surface, this wide fractured zone is made up of characteristic altered basalt in which occurs numerous quartz stringers that contain calaverite as well as visible gold, the whole indicating a comparatively wide ore body."

The Sullivan and the Siscoe properties, in the Harricana River district in Northwestern Quebec, which are under option to the British Minerals Corporaton, are to be aggressively explored.

Payments have been made at regular intervals on the purchase price of the Murray-Mogridge property, and upwards of half of the total of $100,000 has now been paid. On the remainder, it is learned, an extension for one year has been secured. The company is stated to have undergone a reorganization, control having been either underwritten or purchased by New York interests. It is understood operations will be resumed this winter.

Ore and Bullion Shipments from Cobalt.

During the week ended Oct. 31st, four Cobalt companies shipped a total of nine cars containing 731,792 pounds of ore. The Buffalo, with three cars containing over a quarter of a million pounds, was the leader

Following is a summary:

Shipper.	Cars.	Pounds.
Buffalo	3	263,945
Mining Corporation	3	217,156
McKinley-Darragh	2	189,309
Hudson Bay	1	61,382
Totals	9	731,792

During the corresponding period, the Nipissing was the only bullion shipper, a consignment made up of 75 bars containing 101,370.43 fine ounces having been sent out on the 29th.

The litigation in which the Bailey-Cobalt has been involved during recent years, and which appeared to have drawn to a close, took another turn a few days ago, and an appeal is being heard this week in Toronto. Provided the offer of A. J. Young is accepted, the property will merge with the Northern Customs Company, to be known as the Bailey-Northern Customs, Limited, with an authorized capital of 1,250,000 shares of the par value of $1 each, and with $50,000 working capital in the treasury. It was the intention of the new concern to commence operations this month, but the present delay may defer developments until some time in December.

Mr. Arthur Balfour, who was a member of the British Coal Commission, is now in Canada, visiting the Canadian office of the Arthur Balfour (Canada) Co., Limited. Mr. Balfour's firm is a large manufacturer of tool steel, and he is visiting Canada for the first time since the war.

Special Correspondence

BRITISH COLUMBIA.

The Metal Mines.

Cowichan, B.C.—A gold-copper prospect, located near the headwaters of the Nanaimo and Chemainus Rivers, has been inspected by Wm. M. Brewer, government mining engineer, an application has been for assistance in meeting expenditures involved in the construction of a trail to the property. Development up to the present consists chiefly in the driving of a fifty-foot tunnel. Samples have given encouraging returns, running as high as $105 a ton in values. It is understood that engineers representing the Canadian Consolidated Mining & Smelting Co. are making reports on this prospect.

There is every reason to believe that the copper deposits of Mount Sicker and Mount Brenton are to be exploited on a considerable scale. The work started by G. B. D. Turner, of Butte, Montana, who represents New York interests, is being carried out in a business like manner, a 50-foot shaft having been sunk adjacent to the old Lenora Mine. Behind Mount Brenton and north of the Chemainus river, a copper deposit has been located, which is reported to be large in extent and high in values. The company developing the latter, in connection with which are mentioned the names of A. J. Palmer, of the Victoria Lumber Company and some American capitalists, is applying for water porwer rights on the Chemainus River.

In addition to the Manganese Mine, known as Hill 60, which is being operated by the British Columbia Manganese Company, regular shipments being made to the Tacoma Smelter, Cowichan District, possesses another promising manganese deposit on Shaw Creek. It is situated at the northwestern end of Cowichan Lake and there are reports that its development is to be undertaken. The only reason that this has not been done is that it is not as accessible as Hill 60 but, with the completion of construction on the Canadian Northern Pacific Ry., Vancouver Island, this and other dormant mineral sections will be provided with transportation facilities which are expected to lead to considerable mining activity. Rails have been laid as far north as the Koksilah River, Cowichan, and grading has advanced beyond the northwestern boundary of the Cowichan District on the Nitinat River.

The Blue Grouse Mine, situated on Cowichan Lake, is a promising gold-copper proposition which, as yet, is in a state of development. Some first-class shipments have been made to the Trail Smelter of the Consolidated Mining & Smelting Company. Diamond drilling has been done with results that are said to be satisfactory although no official information is available, the work having been carried out under the Consolidated Company, which is in control.

Stump Lake District, B.C.

In the course of the last few months this section has been visited by Charles Camsell, of the Canadian Geological Survey; Mr. Week, a mining engineer connected with the Bunker Hill and Sullivan Mining & Smelting Company, operating in the Coeur 'd Alenes, Idaho, and other mining men. Interest centered chiefly in the work of the Donohoe Mining Corporation in the unwatering of the Joshua Mine workings and the provision of the equipment necessary to place the property on a producing basis. The old Mary Reynolds Mine, on which development work has been in progress for some time under the supervision of R. R. Hedley, also was inspected. With reference to the Joshua Mine it is announced that the first mining operations will be on the 300-ft. level, water now having been cleared to a depth of 380 feet, and that shipments are expected to be made before long. As to the Mary Reynolds it is stated by Mr. Hedley that the showings are encouraging. He has made a shipment of 45 tons to the Trial Smelter and asserts that the new road to the property, in the construction of which financial assistance was tendered by the Provincial Government, has resulted in a considerable economy in the matter of transportation.

Stewart, B.C.

The survey of the proposed Government extension of the Premier Wagon Road to the Big Missouri Mine has been completed, according to James P. Suttie, who had charge of the work and has returned to Stewart. It is expected that the work will be started early next season and that it will be completed during the summer. This will facilitate the shipment of ore by such properties of the Salmon River district as the Big Missouri, Forty Nine, Unicorn and others. While there may be trial shipments from some of these properties this winter it is not thought that much ore will be sent out. The only regular shipper in the district this winter will be the Premier. It is understood that snow motors now are being built for the company and that they will arrive soon. Just how much ore it is planned to ship is not known but there is a considerable quantity on the dump. The Premier road is al most completed and when the snow comes it will be in first class condition compared with that of last year over which two shipments were made, the returns from which totalled $168,000.

A small shipment of highgrade ore has arrived at Hyder, Alaska, which is close to Stewart, from the Forty-Nine Mine. It is said to rank among the finest ore the district has produced and is expected to average $1,000 to the ton. H. Howson, who is in charge of the work, is very enthusiastic with the showing developed. The diamond drill work, now in progress, is reported to have demonstrated that the Forty-Nine is likely to become a producer of importance.

The mineral zone of the Salmon River is handicapped because of its situation. The rugged mountain range dividing Alaska from British Columbia forces the export of ore through American territory to Stewart, whence it is loaded for the smelters or concentrators. Representations have been made to the Canadian Government that a railroad be constructed to provide a ready outlet for the mineral riches of the country. The reply, it is understood, has been that it is impracticable to build such a road because, as matters stand, it would mean that a section would have to traverse American territory. Naturally, on the other hand, the American Government would be scarcely likely to undertake the work to take care of a Canadian output. Consequently the project, which is considered of first importance to prospectors and mine operators, has fallen back to the shoulders of the latter and everything possible is being done to

induce Sir Donald Mann, who is interested in the Big Missouri, and his associates to take up the task and to make a start next year.

Alice Arm, B.C.

Shipments from the Dolly Varden Mine to the Anyox Smelter of the Granby Consolidated Mining & Smelting Company have been closely inspected by mining men at Anyox who are reported to be favorably impressed. It is felt that the Alice Arm District of British Columbia has an assured future as a mining centre. Important developments are looked for with the completion of the plans of the Taylor Mining Co. in regard to its railway which, it is understood, is to be extended to the Wolf Mine, another silver producer some distance further inland than the Dolly Varden. The railroad now is handling a limited quantity of ore daily but with additions to the rolling stock and general improvements its tonnage capacity will be materially increased.

Quesnelle, B.C.

The announcement that the Ward-Hoppe litigation at last is at an end, the Privy Council having, according to cable advices, upheld the judgment of the Supreme Court of Canada in awarding the Bullion Mine, of Cariboo, to Mr. R. T. Ward and associates has been received with interest generally and with much satisfaction throughout the Cariboo. The latter feel that this large property now perhaps will be operated and the revival of the activity of its plant, which for so long has been idle, would mean considerable to the district. This hydraulic property consists of 1,200 acres. It originally was taken up by a syndicate of C.P.R. officials, the date being 1895, among whom were Sir William Van Horne, Baron Shaughnessy, and Messrs. W. D. Matthews and E. B. Osler, of Toronto, Ont. The syndicate worked it from that date until 1916, sinking a total of $3,500,000 in opening it up and equipping it, $1,500,000 of this amount being taken out of the property itself. Apparently no dividends were declared. In 1906 the syndicate sold to the Guggenheim, who incorporated a company under the name of Cariboo Gold Mining Co. This company never worked it but spent over $500,000 in further equipment and in digging a canal for water supply. There are over 50 miles of canals on the property and a number of large dams and reservoirs. In 1913 the property was sold by the company to R. T. Ward, of California. Ten days after Ward took possession, the property was claimed by John Hopp, a local man, on the ground that under the Mineral Act it had been abandoned, as a miner's license had not been renewed.

Fernie, B.C.

That the Premier Mine, Salmon River, B.C., has been sold is the effect of a report originating in Fernie, B.C., the home of W. R. Wilson, general manager of the Crow's Nest Pass Coal Co.; Roland Wood and A. B. Trites, all of whom are interested in the property. It is stated that the control, as a result of the deal, has passed to the American Smelting Company. Messrs. Wood and Trites are in New York, where the negotiations are said to have been concluded.

The Premier is the best known mine of the Salmon River section. It was because of the exceptional returns given by a carload of ore shipped from this property last winter that the rush of this summer to Stewart, thence to the mineral region of the adjacent interior, took place. The success of the Premier led to the opening up of the Big Missouri and of other prospects which are developing favorably.

Nelson, B.C.

The Beatrice Mine, of Cambourne, B.C., is beginning to ship and it is the intention of the New Era Mines, Limited, to continue the shipment of ore while developing the property. E. Bodine, a mining engineer who has been engaged until recently in the Mount McKinley district with the United States Geological Survey, is in charge of operations. W. E. Morphy, managing director of the company, reports that on No. 2 level, from which considerable ore was taken in 1911, the face is in ore and mining work will be continued in this body all winter. Generally speaking values, as far as past experience is concerned, have run around $60 in silver, when quotations on silver were low, and approximately 34 per cent lead. Drifting is under way from the point at which No. 3 tunnel cuts the vein, with the object of coming under the ore body of No. 2, when a raise will connect the workings. Mr. Morphy says that the company is looking forward to the installation of a mill next year.

Trail, B. C.

No fewer than six new properties make their appearance in the last list of ore receipts at the Trail Smelter of the Consolidated Mining and Smelting Co. of Canada. With the exception of the Sovereign, which is one of the properties operated by Clarence Cunningham in connection with his big reduction plant at Alamo, B.C., all the new shippers are for the time being minor properties under development, and all qualify in the silver-lead-zinc category. The list includes the Freddie Lee, which is being developed by A. W. McCune, and the Ocean at Sandon, the Little Phil and the Tariff, at Ainsworth, and the Zincton in the silver-lead-zinc belt of the Sheep Creek district.

Ore receipts in gross tons for the week from October 15 to October 21, inclusive, at the Trail Smelter of the Consolidated Mining & Smelting Co. of Canada, totalled 4,157, making the aggregate for the year 270,700 tons. The black Bear, of Rossland, with 591 tons; Josie, Rossland, with 174 tons; the Mandy, Le Pas, Manitoba, with 394 tons; the Quilp, of Republic Wn., with 479 tons, were among the chief independent shippers. Of the properties owned by the company the largest contributor was the Centre Star, Rossland, which shipped 1,652 tons. The Sullivan Mine, Kimberley, B.C., the biggest shipper when in operation again was conspicuous by its absence, the strike, to which reference already has been made, being still in force and there being no signs of a settlement.

Grand Fork, B. C.

The Molly Gibson Mining Co., operating about four miles from Paulsen, have struck ore assaying from $48.50 to $125.00 a ton in the lower tunnel of their workings. There are 60 feet of stoping ground and the work of development is proceeding energetically. It is understood that steps are being taken to provide transportation facilities it being the intention to start regular shipments as soon as possible.

Ainsworth, B. C.

A number of Ainsworth miners are forming a syndicate to work a claim known as the 4th of July, situated on Coffee Creek, at a point above the Eden

and Crescent Group. Some ore is reported to be in sight and it is believed that several carloads can be shipped in a short time.

Phoenix, B. C.

O. B. Smith, general superintendent of the Granby Mines Company, has been in Phoenix with E. E. Campbell, mine superintendent at Anyox, B. C., local into the situation with a view to formulating some plan as to the future of operations in that locality. It is apparent that nothing will be done this year but it is considered likely in that district that a concentrator will be installed and mining on a limited scale re-commenced in the spring.

Republic, Wn.

All mines of Republic (Washington) Camp are reported to have closed down some days ago, as a result of a demand by the miners for an increase of $1.00 a day in wages. About 50 or 60 men are affected. Thus the same situation as prevails at Kimberley, B. C. would appear to be developing across the line.

Lightning Peak, B. C.

Favorable reports are received from the Rampolla Group of Claims which are among those which are being developed on Lightning Peak, B. C. Two tunnels have been run on the Rampolla. One is in 150 feet and at the face is in 30 inches of high class ore, which, it is estimated, will assay between 250 to 300 ounces silver. B. Cordiana, who has been in charge of this work, is said to have brought to Nelson, B. C. some of the most beautiful specimens of silver and gold seen in the district.

Camborne, B. C.

The Burniere and Nelson Mineral Claims, situated six miles from Camborne, have been taken over by what is known as the Burniere Gold Mining Company, Indianapolis. The company announces its intention to develop these properties extensively, the construction of a modern mill, which will be in operation by next mid-summer, being planned. The Burniere and Nelson Groups are on the westerly slope of Fish River, and are nine miles from the Beatrice Group, of the New Era Mining Co. It is claimed that the output of the Burniere will average $50 a ton.

THE COLLERIES.

The consumption of coal in the City of Calgary and that part of the adjacent district which has been largely dependent for its fuel and lighting on the natural gas of the area is expected to be largely increased during the coming winter. This is explained by the fact that the supply of gas appears to be failing. The pressure in the City is falling to such an extent that the City Commissioners have ordered that all buildings under their control shall be fitted to use coal with as little delay as possible for heating purposes. The reason for the recent somewhat alarming reduction of pressure is given as being the continued cold weather but the possibility of such a contingency has been foreseen by many, as more than a few of the larger buildings of the City have been changed in respect of their heating arrangements for several weeks.

What will be the effect of the general strike of bituminous coal miners in the United States on men similarly employed, and affiliated with the United Mine Works of America, in Canada? That is a question which is giving some concern to Canadian operators, as well as to the general public which is dependent to a large extent on the output of Canadian mines for their winter fuel. In District 18, U.M.W. of A., which comprises Eastern British Columbia and the Province of Alberta, the concensus at present seems to be that the United States strike will not extend to Canada. At the same time preliminary strike orders have been received by unions of District 18. Officials say that the Alberta miners are not in a mood to strike so soon after the long period of idleness resulting from the One Big Union fight and that, the majority, if ordered to leave work would be likely to refuse. In the event of matters coming to an issue it is considered possible that a movement to secede from the U.M.W. of A. would receive general support. The place of the latter, it is suggested, could be taken by a Canadian Mine Workers' Union.

There is no present indication of a coal shortage in British Columbia. Dealer of Victoria and Vancouver state that there is plenty of lump and nut coal available to meet the current domestic demands. The price of $11.50 per ton, it is thought, will stand. As to the possibility of a shortage later none will venture an opinion. The mines of Vancouver Island, however, are producing steadily and it would appear that the only problem is that of transportation.

B. C. SEPTEMBER COAL PRODUCTION.

The output of coal by British Columbia Colleries for the month of September was as follows:

Crow's Nest Pass Field.

	Tonnage
Crow's Nest Pass Coal Co., Coal Creek	32,192.
" Michel	17,400
Corbin Coal and Coke Co., Corbin	9,537
Total	59,129.

Nicola Field.

	Tonnage
Middlesboro Colleries Ltd., Middlesboro B. C. (short tons)	8383
Fleming Coal & Coke Co., Merritt B. C. (tons)	3155
Coalmont Colleries Ltd., Coalmont B. C. (tons)	1379
Total	12,917

Vancouver Island Field.

	Tonnage
Canadian Western Fuel Co., Nanaimo, B. C.	27,340
" Harewood Collieries	19,302
" Reserve "	5,453
Total	50,095

Pacific Coast Mines Ltd., Morden	5,501
British Columbia Coal Mfg. Co., Jingle Pot	3,344
Nanoose Colleries, Nanoose Bay	2,306

It will be noted that the production of the Canadion Colleries (D) Ltd. are not noted, they being unavailable at the time of writing.

Nova Scotia Notes

Production of Coal.

The output of the collieries is increasing owing to the stimulation of demand caused by the railway strike in England, the heavy demand for coal from Scandinavian countries, Holland, and all the Mediterranean ports as far as the Levant. The longshoremen's strike in New York, and now the strike of the bituminous coal-workers in the central competitive district of the United States, are added reasons for increased demand, with of course the likelihood that if the U. M. W. of A. strike is prolonged, as there seems every reason to suppose it will be, the demand for bituminous coal from Canadian sources will become very insistent. Unfortunately, the collieries in Nova Scotia are not in the best position to take advantage of the great demand for coal, as the output capacity of the collieries is much less than it was before the war. This condition exists irrespective of the still unsatisfactory condition of the working organizations, which are yet—and must continue for some time to be—unbalanced and inefficient.

The output of the Cape Breton collieries of the Dominion Coal Company during October was 280,068 tons. A comparison of October outputs over the past ten years is given below:

1910	330,494 tons	1915	408,247 tons
1911	348,062	1916	313,983
1912	422,343	1917	291,927
1913	438,272	1918	275,890
1914	368,016	1919	280,068

Compared with recent production, the October figures are encouraging, being the highest for one month since August 1918, when the output was 288,781 tons.

The Nova Scotia Steel Company's output during October was 56,507 tons. This is an increase of 4,000 tons over September production, and is the largest October output since 1915. The collieries produced severally as under:

Princess	15,320 tons
Florence	21,913
Scotia	8,184
Jubilee	11,507

Fatal Accidents.

The Mines Office at Halifax states that for the Government year ending Sept. 30th, 1919, there were 17 fatal accidents in the mines of the Dominion Coal Co. and the Scotia Co. at Sydney Mines, for a combined production of 3,542,280 tons of coal.

The Dominion Coal Co. mined during the period from Oct. 1st, 1918 to Sept. 30th, 1919, 3,037,435 tons of coal, and within that time they have had 15 fatal accidents. The Scotia Co., had mined 504,845 tons for two fatal accidents while in 1918 there was a production of 520,677 tons for seven fatal accidents.

All the fatalities in the Dominion Coal Co's mines, occurred in the Glace Bay district, Dominion and Reserve being excluded. There was not one fatal accident in Waterford. The number of mine accidents is being gradually reduced through the greater care and precaution exercised by the men and officials.

LABOR AND WAGES.

The representatives of the coal operators and the mineworkers met in Sydney on the 29th October to discuss the renewal of the wage agreement which has now expired. The men are asking for standard rates at the Nova Scotian collieries, in place of the rates which now exist. These have always varied in the several districts, owing to the differing condition of work, and to some extent because of the lesser cost of living in some localities. The U. M. W. asked that the existing minimum wage for common labour should be increased from $3.11 to $3.40 per day, and submitted the following schedule of the standard rates desired by them:—

Ordinary labor	$3.40
Lamp cabin men	3.90
Lamp cabin boys	2.86
Blacksmiths	5.02
Blacksmiths' helpers	3.34
Hoisting engineers (Coal and man engines)	4.60
Haulage engineers	4.24
Man engineers	3.76
Compressor oilers men	3.83
Compressor oilers boys	2.95
Screen engineers	3.77
Carpenters (Co. to furnish tools)	4.33
Tubmen	3.39
Electricians (left open)	4.21
Mechanics	5.07-4.79
Head firemen	4.21
Stokers and ash wheelers	3.62
Conveyor men	3.75
Pumpmen	4.64
Mason and Bricklayers	5.90-5.30
Teamsters	3.40
Box car loader operator	3.40
Boiler makers	5.07
Boiler makers' helpers	3.80
Locomotive fitters	5.07
Drill hands	3.81
Car shop men	3.54
Painters	4.11
Pipe fitters	4.50

Underground.

Ordinary labor	3.40
Shiftmen and timbermen	3.85
Drivers	3.40
Landing tender	3.87
Shaftmen (left open)	3.86
Trapper boys	2.18
Chain runners	3.87
Stablemen	3.60
Cage Bottomers (left open)	
Donkey drivers (left open)	3.34
Brake holders	3.40
Roadmakers 80 lb. rails	5.50
Roadmakers (left open)	
Mine examiners	4.50
Pick boys	3.40
Rope splicers (left open)	
Slope timbermen in pitching seams	6.00
Fan turner	3.40
Boys pushing down coal	3.40
Shot firers	4.50
Relightermen	3.40
Air Locomotive drivers	4.06
Shot firers' helpers	3.58
Boss drivers	4.00

The conference failed to reach a complete agreement, although it is stated it was marked by friendliness on either side. An official statement was issued by Mr. Charles Fergie, who acted as Chairman of the Conference, as follows:—

"At the joint conference held yesterday in the general offices of the Dominion Steel Corporation by representatives of the coal operators of the province, and the Executive of the U. M. W., the operators informed the representatives of the men that, after giving most careful consideration to the wage schedule presented by the Union, it was found that the business situation and the differences in operating conditions at the several mines in question made it impossible for them to bring the rates paid at the various mines to one common standard.

"The men were informed that the operators could not, at the present time, accept such a schedule as that presented by the Union, or pay the rates named therein. It was pointed out that many of the proposed rates are excessive, and in fact that some of them are not in existence at any of the collieries under the classification shown in the schedule as submitted to the operators.

"Mr. Fergie, in speaking for the companies, stated that they are desirous of meeting, to the extent possible, the requests of the men, and that they would consider paying a higher standard for one or two classes of the lower paid men, both on the surface and underground, provided the Union would enter into a contract agreeing that no further wage demands would be made by the men for a period of one year.

"The men's representatives informed the operators that such a condition would not be accepted by them and they stated they would not enter into an agreement covering any fixed period even after a joint consideration of their proposed schedule of rates.

"This statement, Mr. Fergie announces, compelled him to say that, in view of this unfortunate attitude on the part of the U. M. W. executive, the operators were regretfully forced to the opinion that no satisfactory aggreement appears to be possible at the moment. He added that it is hoped the men will reconsider their position on this point at an early date and so permit the continuance of efforts towards an amicable solution to this important question at an early date."

It is announced by the U. M. W. Executive that application will be made for a Board of Conciliation. Speaking to the Sydney "Post," the Secretary of the U. M. W. said:—

"I believe the fact that the United States miners are carrying on negotiations for wage increases is prolonging our case here to an indefinite length.

"We are no further ahead now than we were when the negotiations opened." The miners are now working on the old schedule of rates, the contract for which expired some weeks ago. Until some settlement is made we will of course continue working under those rates.

"One thing noticeable about our conference was the friendly spirit that existed between the representatives of the miners and the operators, but we didn't get much work done in the way of settling the dispute."

Fear has been expressed in some of the Montreal dailies that a sympathetic strike might be called in Nova Scotia by the United Mine Workers of America in aid of the strike in the central district, but there is little likelihood of this. In fact the report has been contradicted by the officials of the U. M. W. in Nova Scotia—as it has also been in Alberta— and the statement has been made that Nova Scotia will make its own decisions.

There is reason to believe that the demands now being made in the central district by the acting leaders of the U. M. W. there have been contemplated for some time, and that when the U. M. W. of America entered Nova Scotia recently, an understanding was arrived at which will prevent any sympathetic strike in Nova Scotia, as the central district does not desire to be burdened with strike payments from a district where the cessation of coal-mining could have but negligible effect on the main situation, and would at the same time be much resented in Canada.

Undersea Coal Areas in Cape Breton.

The Dominion Coal Company has announced its intention to open a mine at Bonar Head, a point lying approximately half way between Cranberry Head and the Little Bras d'Or Entrance. In choosing this site, the Dominion Company has elected to enter its undersea areas at a point where the workings of any projected colliery will abut upon and definitely limit the further extension of the workings of the Florence Colliery of the Nova Scotia Steel & Coal Company, which Company is now obtaining the greater part of the production of its Florence Colliery from a strip of coal, leased to the Dominion Coal Company, but now being mined upon by the Scotia Co., by virtue of permission granted under a provincial Order-in-Council. The bulk of the undersea leases of the Dominion Company lie between Bonar Head and Point Aconi, and the undersea territory which would be mined by a colliery located at Bonar Head is precisely the tract which is necessary to prolong the life of the Florence Colliery of the Scotia Company.

The Dominion Company has made the formal application required by the Coal Mines Regulation Act for permission to make a new undersea winning, and by doing so have raised the whole issue of the proper and workmanlike winning of the undersea leased area covered by the legislation of the Session of 1919.

Under this legislation the Governor-in-Council is empowered to appoint a Commission to enquire "whether any worked or unworked submarine coal-mining "area now held under lease and subject to the provisions of the Mines Act, can be advantageously "worked in the best interests of the Province by some "other lessee."

The contention of the Nova Scotia Steel Company before the Legislatures at the last session was that it could work the Bonar Head territory more advantageously through the existing openings and workings of the Florence Colliery.

It may therefore be anticipated that before approving the plans of the Dominion Coal Company to operate from Bonar Head, the Nova Scotia Government will appoint the Commission enjoined by the legislation referred to,and will await its enquiry and report.

The legislation referred to does not affect any of the consolidated areas included in the Blanket Lease of the Dominion Coal Company, which all lie to the southwards of the Sydney Harbour entrance. The Dominion Coal Company's leases north of Sydney Harbour are not included in the Blanket Lease, having been acquired by purchase subsequent to the specification of the boundaries of the Blanket Lease under the Acts of 1893.

An exchange of anonymous correspondence is being given much prominence in the Nova Scotia newspapers, regarding the existence or non-existence of metallur-

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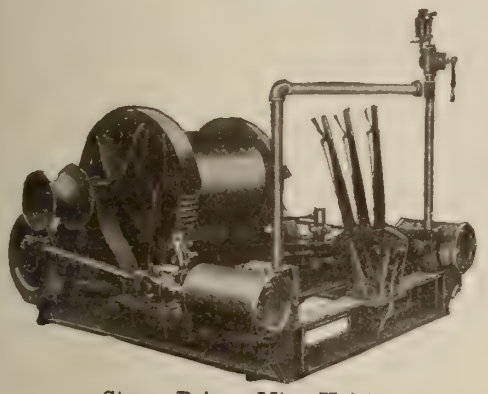

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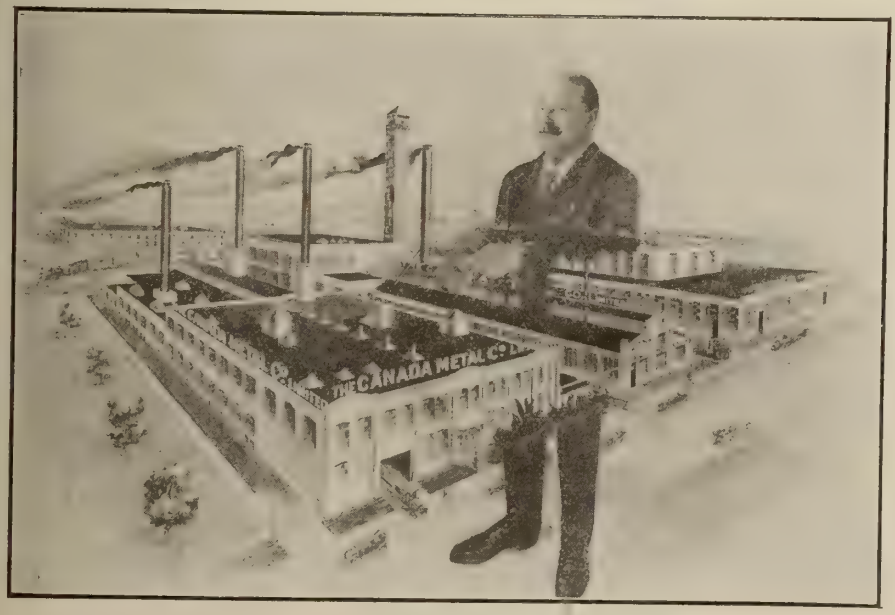

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gical coal and the thickness of the coal seams in the Bonar Head district, all of which miss the main point of the problem as it presents itself to the government of Nova Scotia. The question which the government must decide, as the owner of the coal seams, and as the guardian of the public interest therein, is not concerned with the private interests of any of the lessees of coal areas, but is solely to be determined by whether or not the existing arrangement of the undersea leases is such as will ensure the maximum extraction of coal, at the lowest cost, over the maximum period of time. These are questions that can only be decided by independent and impartial enquiry by competent engineers, and as the government is fully empowered to institute such an enquiry, the appointment of a commission seems the logical course.

The S. S. "Rosecastle" has been returned to the Dominion Coal Company by the Admiralty. This vessel made her maiden voyage to Canada in 1915, arriving at Louisburg on the day that the "Lusitania" was torpedoed. This day will be remembered by a number of the officials of the Dominion Coal Company, who indulged in an unusual holiday by going to Louisburg to meet this vessel, whose safe arrival at a time when the high seas were so unsafe, was a matter for congratulation, a feeling that was turned to something approaching consternation when on arriving back at Glace Bay they learnt of the wanton, but pregnant action of the Germans in sinking the "Lusitania" and murdering her passengers. The "Rosecastle" carries some 10,000 tons of coal. There are still two others of the Dominion Coal Company's freighters to be released.

CROSS-COUNTRY PERSONALS.

Nova Scotian, and more particularly Cape Breton readers of the 'Journal' may be interested in the following gleanings from the Western Canada Coal Review, a coal trade paper published in Winnipeg, which covers the four western provinces, and pays particular attention to the sales end of the coal business.

The contents of the latest issue show how greatly the coal industry of the West has drawn upon the men trained in the coal districts of the East. An article on "Figuring Costs in the Retail Coal Trade," promises a series of articles on coal sales accounting by Fraser Cameron, district sales manager of Coal Sellers, Ltd., Winnipeg. Mr. Cameron was formerly with the Dominion Coal Company at Glace Bay, and for many years filled the responsible position of cashier to that company. He was born in Glace Bay, and his brother was mayor of that town. Mr. Cameron must have realized that changes had taken place in his native town, when, on the occasion of a recent holiday visit to his home, a local newspaper referred to him as "a man who used to live in Glace Bay!"

Another article in the October issue of this western paper is by Mr. Frank Sawford, who was for a long time the electrical engineer of the Dominion Steel Company, and afterwards was mechanical engineer to the Canadian (D) Collieries, Ltd., of Vancouver Island. He is now a member of the Taylor Engineering Co. of Vancouver. Mr. Sawford's abilities have been generally recognized in the West.

The following items from the "Screenings" column will also appeal to Cape Breton readers.

Daniel MacCauley has been appointed mine manager with the Newcastle Coal Co., Drumheller, and Mr. Peter Murphy has been appointed overman.

Mr. Donald McAskill has been appointed overman with the Atlas Coal Co., Drumheller.

Mr. Andrew McQueen has been appointed overman at the mine operated by the Lethbridge Coal Co. Mr. McQueen has recently returned from overseas service.

Mr. Joseph MacIntyre has been appointed mine manager with the Sherness Coal Co., Sheerness.

Mr. H. A. Lovett, K.C., of Montreal, president of Coal Sellers, Ltd., recently visited the Winnipeg office.

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:-: EDITORIAL :-:

Winnipeg and Toronto—A Parallel

Winnipeg men are drawing a parallel between the growth of Toronto, as it was assisted by the opening up of the mineral deposits of Northern Ontario, and the City of Winnipeg, as it may be affected by the development of the mineral deposits of Northern Manitoba.

The Manitoba Free Press writes: "Nothing in its "history did so much in a short period for Toronto "as the development of the mineral areas of Cobalt "and Porcupine, and the same remarkable expansion "may be witnessed in the next decade in this city."

The parallel seems to be correctly drawn. The authoritative descriptions which have from time to time appeared in the 'Journal' written by Dr. R. C. Wallace, the Commissioner of Northern Manitoba, and by Prof. Justin de Lury, leave no doubt of the great promise of the district north of Le Pas.

In this issue will be found a summary by Dr. Wallace of the work done in Northern Manitoba during the Summer just passed, together with a new map of the mineral belt tributary to Le Pas.

At the present time access to the district is very difficult, and will remain so until the extension of the railway from Le Pas takes place, but this extension, it is understood, is now assured.

In this connection, the significance of the mineral occurrences in the Upper Harricana River district of Northern Quebec, recently described in the 'Journal' by Mr. Adhemar Mailhiot, should not be neglected. As the Northern Ontario mining camps were opened up by the extension of the Temiskaming & Ontario road, so has the Transcontinental Railway opened up a new country, giving the district around Amos about equal facilities for access from either the City of Quebec or from Toronto. Our Northern Ontario correspondent suggests the likelihood of an extension of the C.P.R. road northward from Kipawa, which would mean a paralleling of the T. & O. through a district the similarity of which to that traversed by the T. & O., combined with known mineral occurrences, is such as to suggest that Northern Quebec may become the counterpart of Northern Ontario in due time. In such an event it will become a question of railway strategy whether the cities of the Province of Quebec will benefit from the wealth which undoubtedly is contained in the Province, or whether Toronto will experience a further stimulus from mining developments that are already in rapid progress in the Province of Quebec.

Free Competition in Coal Mining Undesirable

Mr. H. A. Lovett, giving evidence before the Coal Commission appointed by the Alberta Government which has been sitting in Edmonton, said: "Free com- "petition in the coal industry in Alberta has proved "an expensive luxury, and by it much money has been "wasted and lost. Twenty mines could produce the "six million tons of coal supplied to the prairies by "more than 300 mines working in Alberta."

Similar conclusions were reached by the various reports of the British Coal Commission, and in this regard all the reports concurred.

Actual trial demonstrated the evils of unrestricted competition and operation of coal mines in Nova Scotia, and led to the incorporation of the Dominion Coal Company in 1893, and a good many years ago after studying the history of the Nova Scotia coal trade from its earliest beginnings, the writer was compelled to the conclusion that the logic of events "indicated the chief hope of settled prosperity in the Nova Scotia coal trade to lie in the further development of strong corporations."

Whatever financial stability attaches to the coal companies of Nova Scotia is a testamentary benefit conferred by the General Mining Association, a monopoly that with all its faults, rendered it possible to conceive mining operations on a comprehensive basis, eliminated suicidal competition in selling prices; and enabled mine workings to be laid out with the maximum of economy, with due regard to the conservation of the vast coal reserves which sporadic individual operations have tended to endanger by uncoordinated effort.

The efficiency of monopoly in operation is not to be denied. Its dangers lie in the political direction, and not in the direction of the working out of monopolistic ideas in industry. The idea of the nationalization of coal is in the air. It is a plank of the platform of the labor party in England. It is one of the de-

mands of the labor party in the United States, and it is an accomplished fact in some countries.

The British Government has accepted the principle of public control of coal resources, but it has refused to accept the principle of public administration of actual production and management of the coal mines, believing that such is the province of private enterprise and initiative. At the same time, by providing for unified control of engineering problems within a selected district, it has placed its seal of approval on one of the most beneficial possibilities of monopoly, and has, to an extent that is yet to be realized, suggested the formation of great consolidations of colliery enterprises. It has in fact laid down the principle that where the conflict of private interests militates against the economical operation of coal-mining, these conflicting interests must be composed by private agreement, or submit to adjustment by officers of the State, but, in any event, the public interest is not to be endangered thereby.

The distinction between public ownership of the coal seams, and public oversight of their extraction and the engineering problems associated therewith; and the commercial direction of coal mining enterprises, may seem to be a distinction finely drawn, but we believe it is properly drawn. The distinction lies in the proper functions of government. It is right for a government to conserve the natural resources of a country. This course is now generally admitted not merely as a right, but is enjoined as a duty. The propriety of government control of industry—except in national emergency—is the most debateable thing on earth, but it is not admitted in those civilized countries that have achieved political stability.

The Anniversary of the Armistice

A year ago silence came over the fighting fronts in France and Belgium, where for over four years the noise of the guns did not cease, and where the battle line swayed east and west, the final battles ending where the first tremendous battles of August and September, 1914, commenced.

The Germans were defeated by superior forces, on land and on sea—but chiefly on sea, but these forces were not more overwhelming than those that sought desperately, but vainly, to break the allied line in 1914 and again in 1918. Had the German armies been waging a defensive war, as they told the world they were; had there been any threat to the national independence of the German peoples, such as the threat of the German leaders against Belgium in 1914, the German hosts could have fought a bitter fight for many months, maybe years, to come, but the heart had gone out of the German soldiers. Theirs was a cause that only victory could justify, and defeat brought the disclosures which made plain the insincerity of the German leaders. No man fights well when he discovers that, instead of fighting as he supposed for hearth and home, he has been the dupe and accomplice of thieves and liars.

Early in the war, Hilaire Belloc likened the German machine to a glass rod. Steady pressure, he said, on a glass rod produces no visible effect, no bending, no apparent weakening, until, suddenly, the rod breaks, and breaks irremediably, suddenly and once for all. And so it proved. The inherent rottenness of the German cause, without minimizing the military effort and bravery of the allied armies, contributed to the suddenness and irremediable character of the German debacle.

Peace, unfortunately, did not come with the Armistice. The Russian people, also deceived by those who had been entrusted with the equipment and the command of the Russian armies, were overwhelmed by the bitterness of utter defeat, and between rage, despair, ignorance and the apathy of poverty and disease, fell a prey to the false prophets which the German leaders themselves conveyed into Russia and assisted in their destruction of all that remained of Russian national strength.

The Bolshevists, like one of whom it was said: "they made a wilderness and called it peace," have made of Russia a Hell, and have called it Heaven. These men have puzzled the world by studied hypocrisy. They have committed the ordinary crimes specified in our criminal code, and have called their action political, thereby deceiving many good and earnest men. They have called murder "national safety," rape they have termed "eugenics," and to ordinary criminal actions, usually punished by the scaffold, they have applied the nomenclature of Christian ethics and philosophy.

The German failed because his system was founded on original error. For the same reason the Bolshevistic conception will fail. The world is not yet convinced that the false leaders of Germany have seen the final consequences of their misdeeds, nor whether the dregs of defeat which that misguided country has yet to drink may not cause, even yet, popular excesses which may rival the unhappy events of the past two years in Russia. This is a possibility which is not the concern of Germany alone.

Progress in the Northern Manitoba Mineral Belt

(R. C. WALLACE)

The summer of 1919 has been one of prospecting, not of actual mining, in the Northern Manitoba mineral belt. There have been several reasons why capital has not been so extensively utilized in this field as merits of the properties would warrant. These reasons it is unnecessary to discuss here, with the exception of the all-important and fundamental one—the lack of railway facilities. For gold properties such facilities are almost necessary: for copper properties they are indispensable. The stage has now been reached in the district generally where, with the building of a railway to the Flin-Flon property, mining would become active throughout all the western half of the belt, and the eastern section would undoubtedly be affected by the movement. As a business undertaking, the building of this railway should be viewed with favor, more particularly if the railway be projected to run through the greater part of the western belt: as a national undertaking to assist the liquidation of Canada's debt it should not be longer delayed.

In reviewing the situation in the mineral belt, it will be advisable to deal with the districts seriatum. They may be taken in the following order (from west to east):

1. Flin-Flon and Schist lake district.
2. Athapapuskow lake district.
3. Copper and Brunne lakes district.
4. Herb and Little Herb lakes district.
5. Other districts.

While there is a variety of mineral deposit in each district, there is also on the whole a certain definite type of mineralization peculiar to each restricted area. A discussion of the fields by districts is therefore logical, not only from the geographical standpoint, but to a certain extent from the standpoint of mineral distribution as well.

1. The Flin-Flon and Schist Lakes District.

This, the most westerly area, situated almost on the boundary line between Manitoba and Saskatchewan, is the most widely known part of the belt, owing to the fact that the Flin-Flon property and the Mandy mine are situated within its limits. On the Flin-Flon, since the diamond drilling operations were completed last summer, negotiations have been pending, but no further work has been done. The conclusion of a deal with large eastern interests is expected, and, we trust, will not be longer delayed. A railway will then be built, and a mining camp established. It will then, also, be possible, apart from the 20,000,000 tons of ore which the Flin-Flon property will furnish as a minimum, to renew mining operations on the Mandy mine, in which the mixed copper-zinc sulphide ore left in the mine after the lens of high-grade chalcopyrite had been excavated will furnish additional tonnage to the smelter. In this district prospecting has been directed mainly to the discovery of further bodies of copper ore.

At the north end of the north-east arm of Schist lake sinking is now being done by Greenlees on the Levasseur claim, where, in a seven-foot zone of sheared [illegible] work has considerably heavier chalcopyrite than at the surface. From the inclination of the walls there is a reasonable chance that this may represent the north end of an ore body pitching southwards underneath the lake. The intention is to sink fifty feet vertically, and to drift southwards in order to follow the ore body along the strike if it is intercepted at this depth.

On Hook lake also, immediately west of a small bay on the west shore of the lake, the group of prospectors who staked the Flin-Flon have done some work on four stringers of fairly rich chalcopyrite, no one of which exceeds three inches in width, dipping 80 deg. west. At the bottom of a pit nine feet deep one of the stringers flatten out in the northeast corner of the pit, and a good deal of chalcocite occurs in this lens associated with the chalcopyrite. The sheared zone in which the stringers appear in the porphyry has been followed for some distance in a somewhat irregular course, and can be traced by the showings of the green and blue copper carbonates throughout.

On the west side of the northeast arm of Schist lake, and on the east side of the main arm of Phantom lake, iron sulphide bodies have been prospected, which may be taken as typical of the most extensively represented form of mineralization throughout the whole mineral belt. In these, as in all other cases, the lead is a carbonaceous schist impregnated with pyrite and to a minor extent pyrrhotite, with occasional showings of chalcopyrite.

On the Three Nations and Surprise claims, Schist lake, the trenches show a total width of seventy-five feet, with an additional twenty-five feet of rusted rock untrenched. Within this are bands of quartz much less heavily mineralized.

On Rosen's property on Phantom lake a fifty-foot cross trench has been made across a similar band of mineralization. In the immediate vicinity, and more particularly at the south end of the lake (Wonder claim), quartz veins show pyrite, a little chalcopyrite, and somewhat abundant molybdenite.

2. Athapapuskow Lake District.

On the Chica property the eighth hole is now being drilled. On the cross-trenches on this property, which is a sericite schist and porphyry at the granite contact, and flanked on the east side by a band of conglomerate, fairly abundant pyrite is seen in the schist with but little showings of copper sulphide. The dip is steeply westwards, and the drill-holes, which are now being put down across the strike from the west, are inclined at sixty-five degrees. This single claim is now being projected for the third summer in succession.

East of the rapids, near the Pine Root river, and along the shore of the lake, trenching and tunnelling has been done on a series of claims staked on iron sulphide bands striking northwards, intimately asociated with granite, and in which are scattered showings of chalcopyrite.

From the north end of the north arm, on Thompson lake, a vein of mixed chalcopyrite and pyrite has been [illegible] system.

Trout and Tartan lakes north of Athapapuskow lake area, and at various points along the Hudson Bay railway as far as Manitou crossing on the Nelson river.

* See Canadian Mining Journal p. 731 issue Oct. 1st. 1919.

In these widely separated areas there is a variety of mineral occurrences, on none of which has extensive work yet be done. They fall into one or other of the three types already more fully described in the other districts:

1. Quartz veins carrying gold.
2. Copper sulphides, either in stringers in quartz or disseminated through the greenstone.
3. Iron sulphide dykes, with low values in copper, nickel, gold and occasionally platinum.

At the present stage it is unnecessary to enter into details in connection with any of these areas. With the exception of the Elbow lake district and the narrows between the first and second Cranberry lakes, little has been done beyond staking and stripping. The mere enumeration of the districts involved will indicate that attention is no longer confined by the prospector to the districts in the immediate vicinity of the original discoveries in the mineral belt, but that a wide field is now under exploration, covering practically the whole of the greenstone area in the belt.

General Conclusions.

(1) The work of the past five years may be characterized as very successful prospecting. In order that successful mining may ensue, railway transportation is essential. Until such transportation is provided, mining operations will be difficult on the gold properties and impossible on the copper properties in the western section of the district.

While the extent of the Flin-Flon property in itself amply justifies building a railway, it is very desirable, from the point of view of the mineral belt as a whole, that that railway should cross the belt east of Lake Athapapuskow and reach the property from the east, and in this way place a comparatively large section of the mineral belt in direct touch with transportation. When negotiations are finally concluded in the Flin-Flon property the building of the railway cannot be any longer delayed.

(2) While in the search for copper properties no discoveries have yet been comparable to the Flin-Flon and Mandy properties, prospecting has revealed a very widespread occurrence of copper sulphides throughout the mineral belt, and more particularly on the western section. There is therefore ample encouragement for still further and more detailed prospecting for copper ore bodies in the mineral belt and, in certain instances, for the expenditure of capital in the underground prospecting of properties already obtained.

(3) As far as gold mining is concerned, interest now centres more specially on unusually large gold-bearing quartz lodes and silicified zones on the Copper and Herb lake districts. Much money will require to be spent on the underground prospecting of these and similar large properties. With the stimulus which gold mining is now experiencing throughout the continent, it cannot be doubted that the money will readily be spent by such mining corporations as are desirous of acquiring ore bodies of large dimensions with sufficiently high surface values to justify underground prospecting on a large scale.

(4) Throughout the belt the iron sulphide bands are remarkable both in respect of distribution and width. Such bands have been cross-channel assayed only to a very limited extent. Because of their extent, and also because of the fact that fairly wide quartz lodes are here and there closely associated with iron sulphides, careful attention should be paid to these occurrences, in order to determine whether sufficient quantities of copper, nickel, gold and platinum are present in any such occurrence to make operations profitable on a mineral body of large dimensions.

(5)It cannot be too strongly emphasized that the staking of claims must be followed by, and indeed preceded by, intensive prospecting, if good results are to follow to the district as a whole. In certain areas the actual work done is as yet entirely incommensurate with the amount of territory which, being already staked, is no longer available for prospecting by anyone but the owners of the claims. The regulations with regard to staking and assessment work are very favorable, and not the minimum but the maximum of work will always be done on the claims recorded by those who keep the welfare of the district closely to heart.

DEPT. OF MINES PUBLICATIONS RECEIVED

Museum Bulletin, No. 29, Geological Series No. 36, "The Discovery of a Portage Fauna in the Mackenzie River Valley, by E. M. Kindle, and a "New Species of Pelecypods from the Cretaceous of Northern Alberta," by F. H. McLearn. Illustrated by plates.

The first report correlates fauna found in the upper Devonian of the Mackenzie section with the Portage of New York.

Mr. McLearn's report deals with new fossil species collected from the Colorado group, which includes the Pelican shale, Pelican sandstone and Lower la Biche formation in the Athabaska Valley, and the St. John and Dunvegan formations and the lower shale and Bad Heart sandstone groups of the Smoky River formation in the Peace Valley. The group of Lower Cretaceous Age embraces the McMurray tar sands, Clearwater and Grand Rapid formations in the Athabaska Valley and the Loon River and Peace River formations in the Peace Valley.

These two reports give more exact knowledge regarding the stratagraphical relations of districts in which much interest is now being taken because of their mineral resources.

Colored geological map of a portion of the Rex Group of claims at Wekusko Lake, Manitoba. Publication No. 1763, to accompany Memoir by F. J. Alcock.

Map showing the geological structure of the oil regions of Lambton County and adjacent portions of Middlesex and Keat Counties, Ontario, to accompany Part E. of Summary Report by N. Y. Williams, 1918. Shows oil pools and structure contours on top of Delaware (Corniferous) Limestone, with cross-section of territory from the vicinity of Perch on Lake Huron to Thamesville.

The greatest military power in Europe is without an army; the navy that menaced us is at the bottom of the sea. —Premier Lloyd George.

Did you buy your Victory Bonds?

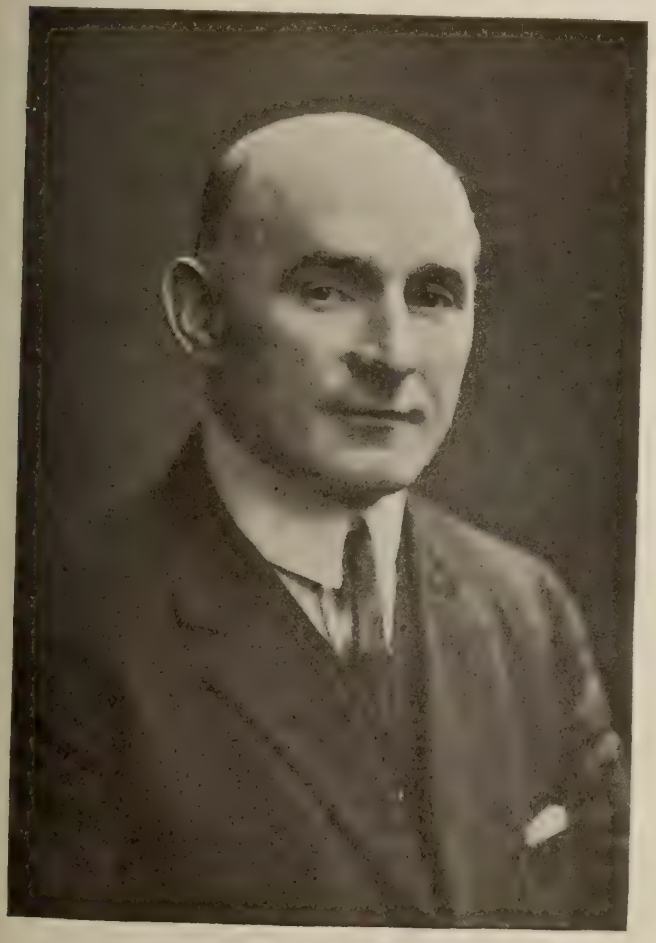
CANADIAN COAL MEN.

George Wilkinson, Chief Inspector of Mines for British Columbia.

Mr. Wilkinson comes from Cumberland, England, a county that boasts of Skiddaw and some of the oldest lead mines of the North Country. It is a country that pulls hard at the heartstrings of those who claim it as home, and in many respects the Cumberland man is not unlike the Cornishman, and enjoys a "la'al crack" about the tarns and moors and ancient mines that are its boast.

Born at Greysouthen in 1876 and commencing to work about a coal mine when thirteen years of age, Mr. Wilkinson received that most lasting of all educations, gained from actual experience in youth, and emigrated to British Columbia in 1896. He worked successively in collieries at Wellington, Vancouver Island, at Nanaimo for eight years, during which time he studied mining and passed for a first class certificate of competency as mine manager. After serving in the capacity of shotlighter and fireboss he became overman at the Protection Mine of the Western Fuel Company in 1904. After a year's service Mr. Wilkinson was appointed mine manager of the new Northfield Mine of the same company, filling the position for three years, when he resigned to accept the post of superintendent of mines for the Pacific Coast Coal Mines, a new company commencing mining operations on Vancouver Island. After the company had acquired holdings at widely separated points he was promoted to general superintendent in charge of all operations. After five years of hard work in this position Mr. Wilkinson was compelled to resign by ill-health. After resting for a time he engaged in consulting practice, and reported on many Pacific Coast properties. In 1914 he rejoined the Western Fuel Company's organization and was appointed manager of the Reserve Mine, then being opened near Nanaimo. After three years in this position Mr. Wilkinson was appointed Chief Inspector of Mines for British Columbia in 1917, and has also been chairman of the Board of Examiners for coal mining certificates of competency since the recent amendment to the C.M.R. Act of B.C. was passed. Mr. Wilkinson is also chairman of the Coal Miners Minimum Wage Board.

The duties of a chief mine inspector in British Columbia collieries are probably more varied than anywhere else, as the coal occurrences vary from highly inclined, thick and gaseous seams in mountain altitudes, with extraordinarily heavy overburden, to the more normally situated, but yet difficult seams of Vancouver Island, which, as is perhaps not generally known, include extensive undersea operations, and some conditions unique in Canada. In Mr. Wilkinson's home county is to be found the most extended undersea coal-mining operation in the world, so that in this respect he should be well able to advise on undersea mining practice.



GEORGE WILKINSON
Chief Inspector of Mines, British Columbia.

DR. W. G. MILLER BACK FROM ENGLAND.

Imperial Mineral Resource Bureau of British Empire is now thoroughly organized and under way.

Dr. W. G. Miller, Provincial Geologist, is back at his desk in the Parliament Buildings at Toronto, having just returned from a six months' stay in Europe. Dr. Miller's mission was to England where most of his time was spent in completing the organization work of the Imperial Mineral Resource Bureau, which was established about two years ago for the purpose of sizing up the mineral resources of the British Empire and to place them before the wrold. In an interview with the Canadian Mining Journal, Dr. Miller stated that the organization was now thoroughly under way and that already much had been done through the co-operation of the various countries of the Empire in bringing before those interested the mineral potentialities of the colonies and the mother country. A work at once to be undertaken is the issuing from time to time of publications containing descriptions and statistics of the mineral resources of the various countries and these will be widely disseminated, while the mining laws will also be incorporated for the general information of the mining industry. Although started in the last year of the war, the organization could do little, owing to the unsettled conditions generally, but the Bureau is now thoroughly established and excellent results are looked for.

While in England Dr. Miller took advantage of the opportunity to tour the battlefields of France and Belgium. Although the peoples of both countries are still stunned by the awful tragedy of the war, he says that reconstruction work in a number of districts is energetically being carried on. Living in France, he says, particularly in regard to food prices, is cheaper than in England.

DEVELOPMENTS IN MINING PRACTICE. AT THE HIDDEN CREEK MINE, B. C.

E. E. Campbell, Mine Manager at the Hidden Creek Mines of the Granby Consolidated Mining & Smelting Co. Ltd., has written an article explaining recent operations in these mines and new methods introduced to meet in a measure, the high costs resulting from the war.

He says:

The necessity of meeting the steadily increasing costs of labor and supplies, due to war conditons, presents many problems to the mine operator. At the Hidden Creek Mine of the Granby Company many changes were made in details of work, numerous economies were carried out in the use of mining materials, and improved equipment was installed in order to meet the continually increasing prices. The minor changes made during the latter part of 1915 and the first part of 1916 may be summarized as follows:

A Corps of Picked Men.

An accurate record was kept of all explosives used, and the consistent use of tamping in all first blasting was introduced. Specially picked men, receiving bosses' pay, were detailed to watch the powder consumption and to instruct inexperienced men in its proper use. Extensive experiments were made with the different kinds of rock drills, as well as with the different types of drill bits, which latter proved an important factor in increased drilling speed. A ban was placed on bulldozing as far as possible, and boulders were drilled that could be reached with safety. Centrally located pockets about fifteen feet square were driven from the 385 level or shipping tunnel, to embrace a large area of stoping ground above the 530 level, which eliminated the transfer of broken ore on this level. All pocket chutes were increased in width from three feet two inches to five feet eight inches, and a new haulage system was installed on the 385 level using cars of 130 cubic feet capacity with twelve-ton locomotives, instead of the former equipment of 75 subic feet cars and six-ton locomotives.

Improvement Shown.

While a marked improvement resulted from these efforts, the real operating problem was not completely solved, which is the handling of the broken ore from the first blasting in the stopes and glory holes, through the mine to the crusher plant.

The mineralized schist making up No.2 and No. 3 ore bodies drill fairly well and often breaks readily in very large masses. This is due to slips, seams and occasional small dykes cutting through the ore body. After these natural partings are broken the remaining large pieces are more resistant to blasting. To illustrate: A few months ago a piece of ground measuring 60x30 x20 feet, containing several thousand tons, was blasted down in the glory hole. It rolled at least 150 feet without breaking, and it required several days' drilling to break it fine enough to let into the pockets.

When the first central pocket was driven from the 385 level to the upper workings it was equipped with a manway at the lower end, which entered the pocket at a point about twenty-five feet above the chute. Here a big opening was made to make room for drilling large pieces before they reached the chute. Another entrance was made at a point where the pocket passes the 530 level. It was soon found that many large pieces escaped from the glory holes and stopes into the pocket before they could be drilled. These frequently blocked the pocket a hundred feet or more down. Dislodging these rocks entailed a great deal of danger to the men doing the work, as well as consuming an excessive amount of powder as it was impossible to use a drill in such a position, and bulldozing had to be resorted to. When the rock blocking the pocket was exposed from the top the usual procedure was to place the powder in a sack, light the fuse and lower the sack on to the rock with a rope. If this rock is covered up, as often happens, the only alternative is to use ladders to climb up from the nearest manway below, and place the bulldoze to the best advantage possible. There have been times when several cases of powder was used to clear a jam of boulders in one of these pockets.

Thus, at this stage the saving in tramming expected from these pockets proved more an expense than an economy. As soon as the work could be done, a manway was driven up beside the pocket from the 530 level to the top, with opening into the pocket at intervals of about thirty feet. Equipped thus, it was much easier to reach a blockade, but the amount of powder required to keep the pocket open was still excessive, and many pieces passing readily through the pocket were too large to go through the chute. These frequently had to be bulldozed at or near the chute, making big repair costs and wasting much powder.

Successful Experiments.

The next experiment was to pass the rock going into a pocket over a grizzly. At first the idea of having pieces of rock weighing fifty tons and more rolling on to a grizzly did not seem practicable.

The grizzly installation was made at the 530 level. A bulkhead was put in the pocket below the tunnel level. From a point below this bulkhead a raise was then driven, breaking into the bottom of the tunnel, and grizzly rails were fitted into this opening A second was then driven from above the grizzly back into the pocket. This latter raise diverted the ore out of the pocket on to the grizzly, and the lower raise returned it into the pocket again below the bulkhead. The pocket above this grizzly was further increased in size to lessen the possibility of blocking.

The grizzly rails are eight feet long and they are placed three feet apart. Although much difficulty was experienced in procuring rails that would stand up to such violent service, and the cost of renewals seem extravagant, the reduction in explosives and chute repairs, together with the advantage of uninterrupted operations, far surpass any of the disadvantages.

The rails now used are made up of two 125-lb. track rails bolted strongly together, and each is reinforced with a 1x5-inch flat iron strip riveted on to the bottom. The temper is partially drawn from these rails before using, as they are very brittle and break readily. Under ordinary circumstances these rails last from one to two weeks. It is probable that a more suitable rail can be procured when the steel market becomes normal.

OUR PHOTOGRAPHS OF THE PRINCE OF WALES AT COBALT.

The 'Journal' omitted to mention in the last issue that the excellent photographs of the Prince of Wales taken on the occasion of his visit to the Cobalt mines. were taken by the MacLean Studios of Haileybury, Ont. We saw a number of additional views of the Prince during his Cobalt visit, taken by the MacLean Studios, to whom we have pleasure in referring such of our readers as may desire to obtain original prints for framing.

OIL PROSPECTS IN BRITISH COLUMBIA.

Developments in the Southern Coast Section of the Province and in Southeast Kootenay.

(From our Victoria Correspondent.)

From Eastern Canada comes the report that an organization calling itself the Amalgamated Oil Company, Limited, after obtaining satisfactory reports from the Government and other geologists, has acquire considerable holdings in Southeast Kootenay to the end that the ground may be thoroughly prospected for oil. The company claims to have acquired a lease of 30,000 acres in the vicinity of Sage Creek, the said lease giving the Company the right of acquiring complete possession through Crown Grants at a costs of from $10 to $20 an acre.

The Company has leased to the Crow's Nest Oil Company of Spokane and their associates 4,886.5 acres on a royalty basis, with option to this Company to purchase at $500 an acre. This Company is drilling and are now down 1800 feet on one well.

Negotiations are in progress with one of the strongest United States Companies towards leasing half of the balance of the Company's property on a royalty basis, also with an option to purchase at $500 an acre. Both these leases include an obligation of the lessee to do certain development work. The Company at present does not propose to operate, but will await the results of the development work being done on the property by the lessees.

The following paragraph from the prospectus explains the attitude of the promoters:—

"The business of looking for oil is always a speculation. There is nothing new in this statement, and the public know it as well as the directors. The directors, however, believe that they have obtained the best advice available, and feel confident that their programme will result in what they consider one of the best prospects in Canada receiving a thorough testing.

"The indications of oil and gas at depth have been reported as most satisfactory, and analyses show that oil to be of extremely high grade and its value much higher than the average. Should oil be found in commercial quantities not only the shareholders but the whole country will benefit."

Note:—It has been ascertained in Victoria that the consolidation under control of one organization of leases to land in Southeast Kootenay held by individuals and by companies is in process. These leases in many instances were issued years ago and prospecting for oil in some cases was undertaken. Not a few are in arrears in payment of Government fees, action against the owners having been held up by the terms of the Relief Act which was brought into force for the duration of the war. With the war over no doubt steps will be taken, in due course, to secure delinquent payments. Should an application be made for the assignment of one or all of these leases to such a Company as is mentioned in the foregoing article, accompanied by moneys due, it is likely that it would be granted. There is no doubt that the Government would welcome the thorough prospecting of these lands for oil or for any other natural resource the the discovery of which would be an asset to the country. There also is no doubt that the district in question is considered by some authorities as a possible oil producer.

Oil prospecting has been rousing considerable interest throughout the southern coast sections of the British Columbia mainland during the last few months. A number of companies are engaged in drilling and in one instance some success is reported. The Boundary Bay Oil Co., which is operating near Boundary Bay, has been drilling since last August and is down about 750 feet. At 686 feet a flow estimated at between 6 and 8 barrels a day was struck and it now is reported that oil is flowing at about 25 barrels a day. This latter is through a test hole of 2½ inch diameter, projected beyond the 16" hole and it is expected that oil will be tapped in commercial quantities when the 16" pipe is through to the present depth of the test hole. The Empire Oil Company is drilling in the vicinity of Langley, B. C. and is down about 1,100 ft. A slight showing of oil is said to have been encountered. The Pitt Meadow Oil Company has run a 6-in. test hole about 2,000 feet while the Spartan Oil Company, in the Burnaby District, close to Vancouver, is down about 2,000 feet with a test hole and is reported to be planning the commencement of a commercial sized hole.

THE PETROLEUM POLICY OF ENGLAND.

Petroleum, as is well recognized by students of the subject, is the most important basic factor on which pivots future military and commercial power. It has long been recognized that the wealth and power of a nation have varied in direct proportion to its coal and iron resources (granting that it retained control). That was the fundamental truth of the Age of Steam and the use of coal as the highest form of fuel. Now, however, we are in the first flush of the Age of Gasoline and fuel petroleum, and oil outranks coal in immediate strategic importance. The petroleum resources of the world are mainly under the control of two great powers, both Anglo-Saxon—England and America. The latter predominates at present, because of the vast oil resources which have been discovered within her own boundaries, and because of the organizing genius of her private business concerns. The control of England is growing by leaps and bounds, because of a fixed national policy and, to a considerable degree, of direct government ownership and control.

America has had no government policy regarding oil, since the government dissolved the Standard Oil Company. Since then the warfare against great and powerful business combinations has been neglected, but nothing new has been developed. England on the other hand, apparently taking a lesson both from the threat and example of Germany, has frankly adopted the opposite plan, of encouraging and even forming great oil monopolies, under government auspices. The power of this organized efficiency with the great strength of the British government behind it, as compared with the weakness involved in the negligent policy of America, needs no explanation; and the result is that we must acquiesce in the prediction of various conservative American petroleum experts that before long the preponderant control of the world's petroleum, and with it the military and commercial domination of the world, will pass to Great Britain; and that if the United States sits down to the table of equal political and commercial power anywhere in the world, even at home, it will be by favor of England's request only.

These facts have been known for a long time in private as well as government circles; there is no secret about them, and the magnitude of England's official program in this respect is so great that it could not be concealed, even is she so desired.

We shall soon present an article written by an author whom we know personally, and who states a few plain facts and inferences as plain. The author is in a position to know absolutely that of which he speaks.

This British petroleum policy, it will be shown, is frankly nationalistic and imperial, and bluntly discriminatory, against the United States in particular and all other powers in general. This is part of a similar nationalistic policy in regard to other minerals, the details of which we shall point out from time to time. Plainly, as we stated above, England desires to profit both by the threat and lesson of Germany. Plainly she is determined that no other nation, Anglo-Saxon or otherwise, shall again put her with the extreme danger to which carelessness regarding Germany's schemes and methods submitted her. Her solution for the future, as to plan, is to dominate the world, not only by her old device of a twice preponderant fleet, but by political and commercial control of the fundamental mineral resources of the world so far as possible. Her solution, as to method, is to adopt the efficient German system of state controlled monopolies; and to further safeguard herself by discriminating against non-British investors.

This program was evident during the war, when the nationalistic sentiment was perforce stiffened, as in other countries, by the necessity of strengthening to match the unhealthy German nationalism; and was between friends and partners. America must not submit to be put in such a position as to risk being told by England that such a talk is unnecessary, since she has arranged matters with entire satisfaction to herself. There has been and is much talk of American world domination, which is as indiscreet as England's present policy. Partners in the world's wars, peace, and business must not seek to eliminate or dominate one another, but to divide activities, responsibility, and profits equably.

Meantime, in view of America's sluggishness of insight and action, we can hardly blame England's vigorous and progressive nationalism (we believe it to be fundamentally against the Teuton and not primarily the American), so much as we do America's inactivity; and the firm yet fair method of joining issue with England in regard to her discrimination, in those countries which she controls, against American progress in the ownership and control of petroleum, would be to adopt corresponding retaliatory legislation, thus putting each on an equal footing as business rivals, but making it clear that we prefer that both should abandon selfish and domineering methods, and become true partners instead. In the shoulder to shoulder forward march of America and Britain, we firmly believe, lies the hope of the world; and not less important is the preservation of the dignity, independence, and power of America.—Editorial in Engineering and Mining Journal.

One big trouble with the labor movement is the fact that we have too many cabooses and not enough engines.—Railroad World.

INDIAN PETROLEUM.

A theory is being discussed in British India that oil-beds exist continuously along a belt stretching from Burmah in the east to Roumania in the west. Should the fact be eventually established a discovery of the very highest importance will have been made, for the belt, according to "Indian Engineering," will lie wholly on the Indian side of the Himalayas.

At present, however, only uncertain indications have been found, the latest of which have been discovered by Mr. Middlemiss, who is at present superintendent, Mineral Surveys of Kashmir. He has not so far actually found oil in Jammu Province, but has located geological conditions pointing to the existence of a natural reservoir of a type giving good promise of a store of oil, being in all respects similar to oil yielding structures in the neighboring Rawal Pindi plateau. In the latter region oil had long been known to be present, but efforts to obtain it in quantity were unsuccessful till the Khaur oilfield near Pindigheb was at last located.

AN APPRECIATION OF THE SCHOLARSHIP OFFER OF THE INTERNATIONAL NICKEL CO OF CANADA.

Mining and industrial companies have made great strides during the last decade in the way of caring for their employees, but it has remained for the International Nickel Company of Canada to introduce a new departure, in the form of three annual scholarships for a complete four years' course leading to a degree in science in the universities of Toronto, Queen's, or McGill. The scholarships, which cover all expenses while attending the chosen university, are awarded on the result of competitive examinations among the minor apprentices and sons of employees in the mining and smelting division, which has its headquarters at Copper Cliff, Ontario. The first of the annual examinations has already been held, so that the successful candidates may take advantage of the coming academic year. It will be observed that after the fourth year the company will be paying the expenses of 12 students continuously. So far as we know, this gift is unique, but it is the sort of thing we should have expected from the International Nickel Company, which has already blazed an honorable trail for notably generous dealings with its employees and to increase their well-being. The effect of this gift upon the ambitions of its workmen will be great, but we venture to suggest that the effect upon the mining profession may be even greater. Many of the finest miners and smeltermen we have today were recruited from the ranks of what, for a better term, are often called 'practical' men.' The 'school of hard knocks' develops character of a kind that is often denied those whose earlier years are surrounded by more luxury and less industry. Young men who have toiled hard for their living and who know the disadvantages of lack of training, upon winning a scholarship of this kind will take up their technical course with a full understanding of its benefits, an ability to correlate theory and practice, and an energy that will not let slip any opportunity for acquiring a thorough knowledge of their work. We should advise those that tread the softer path to 'watch their steps;' it is probable that in a few years these lusty young sons of the stope and the blast-furnace will be looming large in the mining profession.—Mining and Scientific Press.

Manitoba Correspondence

Brooklyn.

At the Brooklyn mine, Gold Lake, Manitoba, drifting is in progress at the 100-ft. level. Work was started on this property in March and good progress has been made in spite of transportation difficulties. The owners are for the most part residents of Buffalo. Mr. Bert Clarkson is president of the company and Mr. A. L. Anderson is superintendent.

McDonald Claims Sold.

One of the outstanding figures of the Rice Lake district was Angus McDonald, who was accidentally killed by a hunter in September. Mr. McDonald had secured control of several claims in the area before the war. He went to the front and came home safely after three years service there only to be shot in the woods in mistake for a moose.

Quite recently the McDonald properties have been purchased by a syndicate headed by Gordon McTavish. It is expected that development of some of the properties will soon be undertaken by the new owners.

Financing the Gold Pan Mine, Rice Lake.

Many of the readers of the "Journal" have heard of the Gold Pan mine in the Rice Lake district, east of Lake Winnipeg. From it has been taken some of the richest gold ore ever mined in Canada, and specimens rivalling those of the Croesus have found their way to many cities here and in the United States. The development work done indicated that a very important ore deposit had been found; but the property has been for some time idle and the finances of the company in bad shape. Considerable interest will be taken in the recent re-organization of the company and in the method of financing.

There is now being offered to the public 200,000 shares of 8 per cent preferred stock. This stock in addition to earning interest at a fixed rate carries as a bonus the earning power of three shares of common stock for every preference share issued. The first profits of the mine will be devoted to the repayment of both capital and interest. Then the holders of the preferred stock will share with the holders of the common stock any further profits. The company has 400,000 shares in the treasury which will be issued as preference shares.

The officers of the Gold Pan Company now are: Jas. H. Ashdown, president; F. O. Fowler, vice-president; Gordon McTavish, secretary-treasurer. The other directors are E. F. Hutchings, S. Hart Green and Sam Scott. J. B. Tyrell of Toronto is consulting engineer.

It is expected that development of the property will be carried on rigorously this winter. Mr. Tyrell visited the property recently in company with Secretary McTavish. Mr. Frank Phillips has been appointed mine superintendent.

An Early Freeze Up.

Cold weather descended unusually early on the Rice Lake district this year. Lake Winnipeg is frozen over and the water route from Riverton to Manigotegan and thence up the river to Clearwater Lake is no longer usable. As soon as possible the winter road from Fort Alexander will be made passable for teams. There is no summer waggon road to the district.

Bruce Consolidated.

The Bruce Consolidated Mining Co. owns 275 acres in the Gold Lake area, Manitoba. Development has been recommended by J. S. De Lury of Winnipeg. The directors are Col. Wm. Grassie, Col. E. D. Alderson, Capt. W. B. Tobias, Dr. Halpenny and J. J. Papineau. Col. Grassie is president of the company.

THE POSSIBILITIES OF NORTHERN QUEBEC ALONG THE ONTARIO BORDER.

By J. McRAE.

In connection with the development of that part of the province of Quebec lying adjacent to Ontario, and extending from Mattawa on the south, north to the National Transcontinental Railway, a new era appears to be opening up.

Heretofore, this part of the province of Quebec has been left for the small pioneer, the settler, to develop. Some progress has been made in agriculture, but in this way only that fringe of territory lying adjacent to the Ottawa river and Lake Temiskaming has been opened up.

The construction of the great plant of the Kipawa Fibre Company, a subsidary of the Riordon, at Lumsdens Mills near the south end of Lake Temiskaming, marked the beginning of more intensified development. The plant which is being completed this month, and which is served by the C.P.R. Railway, has been constructed at a cost of around $4,000,000.

Now comes the unofficial report that the Canadian Pacific is considering the advisability of extending the Kipawa branch to the northward, for the time being to terminate near the north end of Lake Temiskaming. The distance, as the crow flies, is about 56 miles, but would perhaps necessitate the construction of 65 miles of line. The road would pass through a comparatively prosperous farming and lumbering district.

Incidentally, and no doubt having vital bearing on the final decision to be reached by the C.P.R. is the likelihood of another huge pulp and paper mill to be erected near the north end of Lake Temiskaming in close proximity to the Des Quinze water power. It is learned that a more or less complete survey has been made of this great water power, estimated to be sufficiently large to generate all the way from 100,000 to 250,000 h.p. and ranking among the largest in the Dominion, with the exception of Niagara. The M. J. O'Brien, Limited, a twenty million dollar corporation controlled by Senator M. J. O'Brien, of Renfrew, owns several hundred miles of territory located along the waters of and tributary to Lac Des Quinze. The same interest controls a large part of the Des Quinze power. It is believed, therefore, that the Canadian Pacific and the O'Brien interests are working together with a view toward realizing mutual benefit from the further development of this area. From Lac Des Quinze, extending away to the north and to the west is territory which as yet is practically untouched. It is an area hundreds of miles in extent, and presenting an almost unbroken mass of timber, broken at intervals by grey-rocky hills rising up through the green timberlands. The potentialities, in addition to its known tremendous value, are enormous. Geological conditions are such as to encourage the belief that deposits of precious metal will be found to occur throughout the area. The northern reach of the C.P.R. at Kipawa is on the threshold of this great new land. By extending to Lac Des Quinze it will have made the first stride in one of the greatest of the remaining opportunities at Empire-building, and would command, unchallenged in competition a territory, vast, and containing untold wealth.

Our Northern Ontario Letter

The Silver Outlook.

With the quotations for commercial bar silver continuing on an upward trend, and with an unfavorable rate of exchange between Canada and the United States, students of finance appear to be growing apprehensive lest is shall be found necessary in Canada in the near future to enact legislation similar to that now in force in Great Britain—making it a criminal offense to melt down silver coin, and placing an embargo on silver exports.

It is perhaps too soon to grow alarmed over the situation, for the reason that the point of bullion parity with the value of the coin has no yet been reached but, in a world suddenly possessed of insatiable desire for silver, a recession in quotations appears to be remote, while, on the other hand, continued demand may reasonably cause a further upward swing. Believing in preparedness, therefore, it seems quite reasonabe that students of finance as well as metal authorities should give the matter the thought necessary to enable them to meet any emergency that may arise.

The high grade mines of Cobalt are deriving the maximum benefit from the present favorable situation. The mines are fully named; efficiency is increasing; costs are declining, and the margin of profit on every ounce of silver produced at the leading mines is greater than the total value of the product a few years ago.

According to figures just obtained from Arthur A. Cole, mining engineer for the Temiskaming and Northern Ontario Railway, which road serves all the productive precious metal mining camps of Northern Ontario, the total ore shipments from Cobalt during 1918, which figures will be contained in an annual report soon to be issued, amounted to 17.911 tons; this being in addition to the large amount of ore treated in local reduction plants. During the year 22 mines shipped ore, the heaviest shipper being the Buffalo with 3,842 tons to its credit, followed by the Nipissing with 2,619 tons and the Mining Corporation of Canada with 2,264 tons. Up to the end of 1918, the mines of Cobalt shipped an aggregate of 266,734 tons since the discovery of silver in 1903. The total silver production up to the end of 1918 amounted to 292,056,976 ozs. valued at $169,241,387.

As near as can be ascertained, the silver output at present approximates $1,250,000 every thirty days, the Nipissing being the chief producer, being responsible for upwards of one-fifth of the total.

At the time of writing a number of important mining deals are being negotiated. Chief among these are the Buffalo Mines, and the old Drummond property. The Mining Corporation is stated to be making a bid for the Buffalo, following the failure of the Temiskaming Mining Company to secure the Buffalo on satisfactory terms. Montreal interests through the former leaseholders of the Foster-Cobalt mine are negotiating in an endeavor to secure the old Drummond mine. In neither case have negotiations as yet reached successful consummation.

At the Beaver Consolidated, some of the richest ore ever found in the mine is being encountered. In addition to a substantial quantity of high-grade, a large amount of low-grade material occurs in close proximity to the vein.

The La Rose Consolidated is stated to be enjoying a prosperous year. Recent shipments of high grade ore have been made, one car unofficially estimated to contain a value of upwards of $75,000. The outcome of the boundary dispute which arose last spring between the La Rose and the O'Brien, regarding which a legal decision was reserved, is still unsettled. A decision is looked for at an early date.

The Nipissing, Mining Corporation, O'Brien, Temiskaming, Crown Reserve, Kerr Lake, and, in fact, practically all the leading producers have scouts in the various mining districts in search of prospective mines. Backed by ample finances, and with excellent managerial organizations built upon more than a decade of successful experience in Cobalt, not a few of these companies are expected to prolong their life indefinitely through the careful selection of other possible paying mines.

Among the properties in Cobalt which have lain idle for a number of years, and which are being operated, might be mentioned the Farah, now known as the Nipissing Extension and the Oxford-Cobalt, a prospect situated south of the Kerr Lake and in the Gillies Limit. Others of the small prospective properties being worked include the Silver Cliff and Foster-Cobalt, while among those likely to be explored or developed at an early date are the Hylands property, to be known as the Victory Silver Mines, and the Silver Hills property, in the north-western part of Coleman township. With these might also be mentioned the old Drummond property, provided present negotiations terminate successfully. Also, presuming that the legal details can be arranged, the Bailey-Northern Customs, (a merger of the Northern Customs Concentrator, Ltd., and the Bailey-Cobalt) is expected to commence operations on the Bailey.

Regarding the affairs of the Bailey, the matter came up before Mr. Justice Middleton on Nov. 5th in Toronto, and at the request of the parties involved, the motion was enlarged until Nov. 19th.

The shareholders of the Tretheway-Cobalt, at the annual meeting held in Toronto on Nov. 7th ratified the proposal of the directors to acquire additional shares in the Castle property in Gowganda on a basis of one share of Tretheway for two shares of Castle stock. The deal to secure the Major property, which adjoins the Castle, and to acquire a lease of 112 acres lying under Miller Lake was also ratified.

It is quite evident that a continuation of the present high quotations for silver will be find practically all the prospective, but idle properties receiving renewed attention, and, in the aggregate, adding considerably to the extent of the silver mining industry of Cobalt.

The Nipissing mine is producing at the greatest rate in its history. The present record according to official advice is at the rate of over $500 an hour or about $12,105,75 every twenty-four hours. At such a rate for one year the output would amount to over four and a half million dollars.

According to the report of manager H. Park to the president and directors of the company, the mine during the month of October produced ore of an estimated value of $375,247, and shipped bullion and residue from Nipissing and custom ores of an estimated net value of $680,208.

Concerning development work, Mr. Park says:—"Underground work is now nearly back to normal. At 73 shaft, development and exploitation is proceeding at four levels. The fifth level will soon be dewatered, which will make 544 winze workings accessable. All operations at 75 shaft were satisfactory throughout the month. One of the cross-cuts at the third level encountered the extension of a known vein, No. 3006, some of the ore being of exceptionally high assay; the width averaging one inch.

"Exploration and drifting was carried on at the second level of 64 shaft. About 60 tons of low grade ore from old surface dumps are daily being sent to the low grade mill. Exploration is being carried on at two levels of 63 shaft. One of the cross-cuts will eventually connect with the lower workings at 96 tunnel. Drifting on vein 109 at a depth of 90 feet below 96 tunnel is about completed. Results of this drifting show the vein to be narrower and lower grade than at the tunnel level; the formation however is different. A cross-cut is also being run to vein 99, the intervening country being considered first class area.

"The low grade mill treated 7,674 tons. The high grade plant treated 230 tons. The refinery shipped 403,830 fine ounces of bullion. The following is an estimate of production for October:—

Washing Point	$127,065
Low grade mill	248,182
Totals	$375,247

Ore Bullion Silver Shipments from Cobalt

During the week ended Nov. 7th, four Cobalt companies shipped an aggregate of seven cars containing 613,548 pounds of ore. The Buffalo with two cars containing 187,308 was the leader, as shown in the following summary:—

Shipper	Cars	Pounds.
Buffalo	2	187,308
Coniagas	2	132,170
Mining Corporation	2	130,060
O'Brien	1	64,010
Totals	7	613,548

During the corresponding period, the Nipissing and the Mining Corporation each shipped bullion, the total amounting to 93 bars containing 113,683 fine ounces, made up as follows:—

Nipissing	60	80,811
Mining Corp.	33	32,872
Totals	93	113,683

The Gold Mines.

A new vein encountered during the past week at a depth of 1500 feet in the Pearl Lake shaft of the McIntyre-Porcupine promises to be important. The ore came into one corner of the shaft, and at the time of writing the extent of the body and its average gold content is not known. The ore, however, appears to be of high grade and seems likely to develop into an important find. This is the deepest point to which mining operations have been carried in any of the gold mines of the province and is pointed to as corroborating the contention of mining men that the Porcupine deposits are deep-seated, and, in some instances might reasonably be found to continue to depths beyond which mining may be carried. It holds out untold promise to the gold mining industry of this country.

The Hollinger Concolidated, with a surplus already crowding close to $3,750,000, with ore reserves according to estimates at the beginning of the year amounting to around $41,000,000, with milling facilities for treating a maximum of 3,500 tons daily, ore averaging between $8 and $9 to the ton, developed to a depth of close to one-quarter of a mile and having at least two-score known ore bodies as yet undeveloped in addition to those being worked is gradually standing out as likely to make a strong bid for world leadership among gold producing mines.

The Dome Mines at its present rate is earning sufficient to cover dividend disbursements at the rate of 20 per cent annually, is the advice given your correspondent by an official of the company. A dividend of 50 cents a share is expected at the beginning of the new year.

On the Dome Extension, arrangements are being made at the 600-ft. level to stope out considerable ore to be treated in the Dome Mill. The result of treating a substantial and representative tonnage of this ore will have a vital bearing on the question of whether or not the Dome will exercise its option on the Dome Extension on or before March, next, on a basis of one share of Dome for thirty shares of Dome Extension.

Among the important properties about which very little has been said during the past year or so is the Schumacher and the Porcupine V. T. N., both properties equipped with large mills and having quite large ore reserves. It is believed that both of these properties will be whipped into shape for operation before very long.

At a meeting of the Gold Reef shareholders held in Toronto, Nov. 7th, the company was authorized to increase its capitalization from $1,000,000 to $3,000,000. This move was made advisable owing to the plans to finance an exploration and development program in addition to the present diamond drilling campaign. The fourth diamond drill hole is now being drilled.

On the Clifton-Porcupine, work is proceeding in an aggressive way, and officials declare that results are satisfactory.

The Porcupine-Kenora is to be developed by underground work, following the encouragement met with as a result of extensive diamond drill tests made.

On the Big Dyke property (formerly known as the McRae-Porcupine), situated in the township of Delora, plans are being arranged to sink a shaft to a depth of 300 feet. Up to the present about $40,000 has been spent on exploration work on this property, on a large sulphide dyke in which occurs a large amount of sugar-quartz and iron sulphides. Low gold values occur throughout the dyke.

The Kirkland Lake camp is gradually becoming more active. According to reports emanating from Buffalo, it is believed the Wright-Hargreaves will absorb the Sylvanite company. The property of the latter company lies directly between the Wright-Hargreaves and the Tough-Oakes. Previous work consisted of the installation of a small electrically driven plant, and the driving of a shaft to a depth of 100 feet at which point two veins were opened up, one of which, though fairly narrow contained considerable ore.

The proposed scheme to construct light railways to the outlying camps is an interesting subject to the Kirkland Lake camp. Any concrete progress made is being watched with keen interest, as it is thought that

in addition to the present macadam road from Swastika to the mines, a light narrow gauge railway might prove to be an added convenience.

In the Fort Matachewan district the Matachewan Gold Mines has commenced diamond drilling, and in a general way is speeding up operations. A saw-mill has been erected and is turning out lumber for building purposes. Also, the government is assisting in the clearing of a right of way which is to constitute the winter road from Elk Lake.

The Robb-Clemmens group of claims have been optioned to the Smith-Norrington interests, and arrangements are now being made with diamond drill contractors to commence work just as soon as the drill can be transported to the property.

Miner Versus Farmer.

Mining interests and business men in general are evincing more than usual interest in the present political situation in Ontario. With the United Farmers of Ontario claiming a larger number of members in the Ontario legislature than any of the other parties, yet not being able to claim a substantial working majority, the naming of the ministry on November 14th the date on which E. C. Drury, leader of the U.F.O., has agreed to take over the reins of government, is being awaited with deep concern in the northern districts where it is feared the mining districts will not be given cabinet representation. Suggestions have been made to the effect that the interests of Northern Ontario and Southern Ontario are so different as to make it quite reasonable to consider dividing the province in two. For the greater part, these suggestions are put forward in a friendly spirit, as tempered with caution, and plainly marked with a desire to avoid undue embarrassment to the present provincial government.

A REVIEW OF THE PRODUCTIVE STATUS OF THE GOLD MINES OF NORTHERN ONTARIO.

By J. A. McRAE, Cobalt.

In an endeavor to give your readers a correct view of the status of the gold mining industry of Northern Ontario, your correspondent has secured official figures upon which to base this summary.

During 1918 the average gold content of the ore treated in the Porcupine district amounted to $9.60 a ton; in Kirkland Lake $11.89, the average in these two leading camps being $10.74 a ton. The smaller and outlying districts now coming into more or less prominence appear likely to equal this average, although, perhaps containing less total tonnage than the camps mentioned.

It will be noted from the table below, that the gold mines of Northern Ontario are at present equipped with facilities for treating a maximum of approximately 6,810 tons of ore every twenty-four hours. The maximum output, therefore, estimating ore at $10.74 a ton, would approximate $73,139 daily, or about $26,695,881 annually.

In dealing with these figures, it would perhaps be well to point out that all but six of the nineteen mines below referred to are beyond the prospective stage. Those in the latter class only include the Davidson, Newray, Associated Goldfields, Argonaut and Hill Gold-Mines. It will be noted that the six mines in the prospective stage account for but a small part of the total milling equipment, and leaves 6,640 tons daily capacity as representing the equipment of thirteen proven mines, which on ore averaging $10.74 a ton would produce a maximum of over $26,000,000. Also, in eliminating the above mentioned half dozen mines, does not necessarily infer that they will not each in time attain commercial success.

Another factor, without which this summary would be incomplete, is the proposed plans at a number of properties for the installation of additional equipment and in some instances the erection of new mills, all of which would serve to increase the total.

In presenting these facts, it might be stated that the following mines are in operations, the others being closed due to labor shortage: Hollinger Co., Dome, McIntyre, Porcupine-Crown, Dome Lake, Davidson, Kirkland Lake, Teck-Hughes, Lake Shore, Miller-Independence, Argonaut, Associated Goldfields.

Following is the maximum capacity of the present mills:

Company.	Daily Capacity in Tons	
Porcupine District.		
Hollinger Con.	3,500	
Dome Mines	1,500	
McIntyre-Porcupine	550	
Schumacher	200	
Porcupine Crown	130	
Porcupine V.N.T.	120	
Dome Lake	80	
Davidson	40	
Newray	20	
		6,140
Kirkland Lake District.		
Kirkland Lake	150	
Tough-Oakes	120	
Teck-Hughes	100	
Lake Shore	70	
Burnside	30	
		470
Boston Creek.		
Miller Independence	40	
		40
Larder Lake.		
Associated Goldfields	40	
Argonaut	30	
		70
Munro Tp. District.		
Croesus	50	
Hill Gold Mines	40	
		90
Grand Total		6,810

Concerning the ore reserves in the gold mines, it would perhaps be dangerous to deal with them all for the reason that at some of the smaller mines sufficient work has not been done to deal with them in safety. It is proper, however, to cite three leading mines, the official figures of which are entirely reliable, namely: the Hollinger with $41,000,000; Dome with $10,000,000 and McIntyre with $5,000,000. These three mines alone contain an aggregate of $56,000,000 in ore reserves. As the total of all the known gold mines of the district, unofficial estimates range from $75,000,000 to $100,000,000. From these figures, together with the foregoing facts, the known magnitude of the gold mining industry of Northern Ontario may be realized

Special Correspondence

BRITISH COLUMBIA.

The Collieries.

The present prospects are that the bituminous mines of British Columbia will not be affected by the strike in the United States. All the collieries of Vancouver Island, as well as those of the Provincial Mainland, are working as usual and there are no reports of impending trouble. The same applies, up to date, to the mines of the Province of Alberta.

It was reported some days ago that the State of Washington would look to British Columbia to replenish its empty coal bins, the assertion being made that 10,000 additional tons would be shipped to the Sound every month in order to assist in overcoming any shortage that might develop.

This caused some uneasiness in this Province, it being felt that it might result in industrial and domestic embarrassment at home. J. M. Savage, manager of the Canadian Collieries (D) Ltd., has stated that his company would make no greater shipments to the United States than usual for the simple reason that it was not in a position to do so. He said that the local demands were so heavy that the Company was fully occupied taking care of them. Certainly the local market would have to be cared for before export was considered. Much the same statement was made by W. A. Webb, of the Canadian Western Fuel Co., which operates the Nanaimo Collieries, who added that the State of Washington could not look for more coal than now was being sent out because it was outside the capacity of the company to make such deliveries. Consequently those who were inclined to dispute a policy of permitting export of coal at the present moment apparently have been silenced.

The bunkering of steamships sailing from Puget Sound ports will not be affected. Most of these vessels call at Nanaimo for their fuel. The Nippon Yusen Kaisha and Osaka Shosen Kaisha vessels will be able to obtain coal from sound bunkers which are filled from Vancouver Island mines.

H. A. Lovett, president of the North American Collieries, Ltd., in his evidence before the Alberta Government Coal Commission, advocated putting the coal mining industry of the Province of Alberta under the supervision and control of a board appointed by the Provincial Government, with power to fix wages, regulate working conditions, pass upon all proposed developments, widen markets, and generally look after the interests of both the producing and the consuming public. Free competition in the coal industry in Alberta, Mr. Lovett said, had proved an expensive luxury, a large amount of money having been wasted and lost. The lack of some public control had been seriously felt, among other ways, by the number of mines in operation. Twenty mines could produce the 6,000,000 tons of coal supplied to the Prairie Province trade at present by more than 300 mines. In some way, Mr. Lovett declared, the State must step in. The present experiment in railway nationalization would show, in due cource, whether the principle should be extended to the mines, but in the meantime the condition of the industry could be materially improved by a policy of public control and supervision.

THE METAL MINES.

Alice Arm.

A. J. T. Taylor, head of the Taylor Mining Company, Chris Spencer and Walter Leek, the latter two being heavily interested in the Company, have returned from a visit of inspection to the Company's property. They found that the season work on the Dolly Varden mine had been satisfactory and that there is every promise of shipments being maintained through the winter. It is expected that the October rate of output will be continued. At present a one thousand foot is being driven below the lowest existing working. This should tap ore bodies 250 ft. below the present tunnels.

The statement is made by officials that the Dolly Varden Mine shipped 112,000 ozs. of silver during September, and that the October total reached 150,000 ozs. The run of shipping ore is returning from 50 to 70 ozs., although some sacked toward the end of the season is expected to run 700 ozs.

The North Star Group, adjacent to the Dolly Varden, has arranged to ship some sacked ore this year. The Tiger Group and the Muskette, across the river, have developed some good showings and will continue with development work through the Winter, expecting to ship in the Spring.

The Dolly Varden officials state that the railroad between tidewater and their mine has experienced no operating trouble so far this year, and the weather alone will determine the length of its winter operations. Up to the time of their departure there had been no snow at the mine. They are of the opinion that the low reaching tunnel now being driven will open up large ore reserves, creating the necessity for extensions to the railroad and a new aerial tramway.

Salmon Arm, B. C.

R. K. Neill, of Spokane, Washington, has confirmed the recent report of the sale of a two-fifth interest in the Premier Mines to the Guggenheim Company and other New York capitalists. This is the largest mining deal made in British Columbia this year. While Mr. Neill declines to vouch for the accuracy of the statement that there are $5,000,000 involved in the transfer he asserts that the value of the ore blocked out is estimated as being between eight and ten million dollars.

Development of the Premier Mine will be continued, a force of sixty men being kept at work throughout the winter. The Company's intention is to erect its own concentration mills, making use of both the location and cyanide processes of gold recovery.

Discussing future plans, Mr. Neill said: "Of course you understand the mine is still a baby mine and like a baby must creep before it can walk. We cannot do all these things in a day but will progress as rapidly and as consistently as possible. We have had many difficulties to overcome. We have had to build a road sixteen miles to Hyder to bring our ore out. This was first constructed as a trail. Later it was widened to permit the traffic of a sleigh. Last year we widened it still more until it was a two-sleigh roadway, and this year it will be a fine highway. We brought 3,000 tons of ore out over the snow last year and must continue to haul out that way this winter. Eventually when our mills and concentrating plants are constructed we shall bring out gold bricks."

George Clothier, Provincial Government District Mining Engineer, after returning from a trip to the

Salmon Arm and Bear River Districts, speaks very glowingly of mining possibilities. He says that recently there have been no less than six properties on the Bear River bonded, interests having been secured in most cases by American capital. He refers to some rich prospects on the Nass River slope, which however could not be inspected because of the snow. Some ore brought from these went as high as 900 ozs. silver to the ton. That preparations have been made for the continuance of work through the winter on the Mineral Hills, Bush, Forty-Nine and Big Missouri properties is confirmed by Mr. Clothier. Supplies were packed to these claims before the road became impassable. He also refers to the fact that with the coming of snow the Premier Mine people will commence bringing out ore.

The Spider Group which has produced some rich silver ore from a narrow vein, is reported to have been sold to interests represented by W. A. Meloche of New York. The consideration has not been made public but it is understood that development work will be undertaken with no unnecessary loss of time.

Miners at Stewart have been interested lately in ore samples from the Motherlode group which was located during the summer by A. W. Balzimer and Patrick McBride. This property is situated about two miles above Big Missouri and comprises six claims. A shipment of fifty pounds of the ore is being shipped to Vancouver. The principal value is silver but it contains also some gold and considerable lead.

Nelson, B. C.

The Morning Star group is showing promise of development, a sample of gold-copper ore having been brought to Nelson to illustrate the character of a new strike made on that property. There are two ledges on the Morning Star group, and it is the smaller of the two which has been receiving special attention. It has been traced for two hundred feet and has been developed by an open cut. The ledge has a width of eight feet and the width of the ore is three and a half feet. Paralleling the small ledge is a large one, twenty feet in width, which shows some copper but has not yet produced such ore as the small one. The two ledges dip toward each other.

A movement has started having in view organization of the different mining communities of West and East Kootenay, British Columbia, for the purpose of directing their united influence and energies to the satisfactory solution of those problems affecting the industries in these sections of the Province.

Representatives of the Associated Boards of Trade have returned from a tour of this extensive district in the course of which a number of the leading mining properties were inspected, information obtained as to conditions in various localities, and public meetings held at which important matters were discussed.

The party went through the Standard Mine Concentrator at Silverton, the flotation process, which is responsible for the recovery of an exceptionally high percentage of the zinc content of the mine's ores, being in operation.

At Slocan City much was learned of local mining activity and at New Denver a general meeting took place, Colin J. Campbell, president of the Slocan District board of Trades, presiding, and W. Thomlinson, acting as secretary.

An outline of the work of the Associated Boards of Trade was given by F. A. Starkey, Commissioner, after which he referred to several projects in mind and on behalf of which he urged the support of all mining men interested in the districts's welfare. One of these was the arrangement, through the Government, for the opening up of idle properties deemed worthy of development by Government Engineers. Such properties could be worked under license by willing parties, if the owners refused to act. But Mr. Starkey's most important theme was the necessity for the establishment of an ore testing plant in the interior of British Columbia. He stated that the Dominion Government had appropriated $100,000 for this enterprise but had shown a disposition to place it at the Coast.

Discussing the need for overcoming this inclination Mr. Starkey said that the ores of the Interior were characteristically complex and its mines were developed, entitling it to a plant at which the problems of the many good undeveloped properties could be solved, properties that now were of no volue to the owners or the country because the owners, unlike the Consolidated Mining and Smelting Co., could not afford the expense of experimenting to ascertain the proper treatment. The ores of the Coast were relatively simple. The latter district had nothing like the development of the Interior and the authorities would not be justified in giving it consideration to the exclusion of the Interior.

That a policy of local syndicates for the development of prospects would be a paying proposition and a great benefit to the mining industry was the contention of the Chairman while C. F. Nelson, member of the Provincial Legislature, was emphatic in the declaration that the Kootenays were warranted in expecting the ore testing plant and that the Province was large enough for several.

The value of such an installation to the Kootenays was dealt with by Mr. Thomlinson who, as an illustration, pointed to the achievement of the Trail Smelter metallurgists who, as a result of experimentation, had made the Sullivan Mine, the ores of which originally gave much trouble, one of the greatest mines in the world. Clarence Cunningham now was treating zinc-silver ore. In the Boundary District flourite was being treated and shipped commercially. On the Arrow Lakes was an enormous ledge of complex minerals that might one day give a large payroll to the district. This depended on the solution of the problem of handling the ore. The Arlington Mine had been closed down because it could not use its second grade ore. Its old dumps were there to-day. There were old dumps and complex ores all through the Kootenay, and there were problems everywhere. Nor were the metals alone of value. There were other mineral deposits which, if their problems were solved, might become sources of great wealth to the country.

Taxation of minerals and the question of obtaining powder at cost for the prospectors and operators were other questions considered.

The following resolution was passed:

"That this meeting urges upon the Dominion Government the need of the erection of a plant in the interior of the Province for the purpose of aiding the miners of complex ores which occur to such a large extent in the Interior.

Therefore we, the representatives of the Associated Boards of Trade and of the mining industry generally, earnestly urge upon the Government the importance and real need of such a testing plant, which would greatly aid the smaller mine owners and the mining industry generally."

The Eureka Mine has finished its milling season. All the ore lately put through the Granite-Poorman Mill has been from No. 2 Level, on which a large body of good ore was tapped recently. Development on this as well as further work on the crosscut being driven to cut the vein on the No. 4 Level will be continued during the winter. In the meantime large samples of Eureka Ore have been sent to five testing laboratories for the purpose of obtaining advice as to the best method of treating it. With this information in hand the management will install the necessary plant to be operated in conjunction with the present stamp-mill which, as it stands, is adapted to the ore of the Granite-Poorman Mine.

Grand Forks, B.C.

Announcement of the cross-cutting of a dyke of high-class lead-bearing ore was made at the annual meeting of the Maple Leaf Mining Company held recently at Grand Forks. Samples, it was stated, ran from 31 to 36 per cent lead. The Company has tunneled 40 feet through the dyke by drifting on the contact, this tunnel now being 35 feet in the lead ore. The main tunnel has been driven for 178 feet and the drift started at about 100 feet from the portal, going through a red formation for a short distance before striking the dyke again. Directors were elected as follows: J. B. Miller, Walla Walla Wn., S. B. Sangers, Oroville Wn., Thomas Dunlop, Chesaw, and C. W. Brown, Molson, Wash., H. W. Collins, John Donaldson, and H. W. Young, Grand Forks. Mr. Young was elected president and managing director and Mr. Donald, secretary-treasurer.

Kamloops, B.C.

R. W. Thomson, Provincial Government Mining Engineer, has returned after making an inspection of the Snowstorm Group of Mineral Claims, Highland Valley, on which the government has been doing some diamond drilling. Surface stripping and other development now is in progress with a view to the resumption of the drilling in the spring. The properties are being surveyed in the meantime. Mr. Thomson also visited the property of the Aspen Grove Amalgamated Mines, Ltd., which now is under bond to James Errington and associates and on which considerable development is proposed.

Trail, B.C.

In order to keep its electrolytic zinc plant at Trail in operation during the inactivity of the Sullivan Mines at Kimberley, B. C., the latter being shut-down through a strike of the miners for an all round increase in wages of $1 a day, the Consolidated Mining & Smelting Company has arranged to treat the accumulated zinc concentrates of various Slocan district properties. The Rambler-Cariboo has 500 tons of concentrates the shipment of which has commenced. The Standard, at Silverton, also has begun shipment of zinc concentrates of which it is said to have some 300 tons. The Echo, at Silverton, is expected to contribute about 350 tons. A large quantity of zinc concentrates has been accumulated by the Rosebery-Surprise Mining Company but it has not accepted the smelting company's terms up to the present. The settlement price is 2 cents per pound for the zinc, 75 per cent of the zinc content being paid for when the concentrates run 50 per cent zinc and 1½ per cent being deducted for every unit the material is under 50 per cent. The settlement for silver is the New York price on the day of sampling, 50 per cent of the silver content being paid for, this rising to 60 per cent if the silver content is 30 ounces or over a ton.

Prince George, B.C.

What is said to be an important discovery of copper ore is reported from the Hansard Lake District, east of Prince George. From samples it is judged that the ore is the richest thus far found in that section of the Province and the vein is reported to be several feet in width.

Victoria, B.C.

The Lucky Jim, Lucky John, and Marjorie groups of mineral claims, situated in the Salmon River section, and near Adams River, Vancouver Island, have been acquired by T. H. Kerruish, who proposes undertaking development work without delay. The Lucky Jim is the only one of the three on which any work has been done so far and Mr. Kerruish considers the showings made sufficiently encourage to warrant further investigation. The ore carries copper, gold and silver values. Mr. Kerruish is asking Government assistance in the construction of a trail to the properties in order that equipment may be shipped in and ore easily transported to tidewater at the mouth of Salmon River.

Vancouver, B.C.

The matter of the dumping in Canada of Mexican lead was before the mining committee of the Vancouver Board of Trade recently when one of the members asserted that the lead producers of Canada and particularly of British Columbia are under a severe handicap in the marketing of their output because of the unfair competition caused by the importation of surplus Mexican lead. It was stated that Canada, apparently, was the only outlet for this surplus, which was being sold at any price it would bring. The committee decided to investigate and, if the allegations are found correct, to asking the Department of Trade and Commerce, Ottawa, to enforce the anti-dumping laws.

An increase of $1,017.75 is shown in the gold deposited at the Dominion Assay Office, Vancouver, B.C., for the month of October of this year in comparison with the total for the same month in 1918. The aggregate value of the deposits last month was $804,231.70, most of the gold coming from the Yukon and the Kootenay districts.

George Adams has left Vancouver for northern British Columbia in order to make preparations for the commencement of hydraulic operations on thirteen one-half mile leases situated on Tibet Creek, 107 miles northwest of Telegraph Creek. The property is reported to be exceptionally favorable for the work in mind, the water used having 400 feet head pressure and the supply being unlimited. The Tibet Creek Valley affords 300 feet of dumping grounds. Mr. Adams proposes operating four distinct hydraulic plants, each using two No. 6 Giants.

Riondel, B. C.

A syndicate has been formed to proceed with the development of the Kirby Group of Mineral Claims at Riondel. This property was located last Spring by A. J. Curle, of Kaslo, B. C., and was taken up by W. T. Kirby, of Winnipeg Manitoba, who is arranging for the work referred to. First class showings were brought to light last July, the interesting point being the establishment that the ore is quite different from the characteristic ore of the Blue Bell, which is nearby, being high in silver. An open cut has been made on the vein, cross cutting it, and 17 feet have been driven without showing up the footwall. In the milling ore is a five-inch width of galena which runs over 100 ozs. in silver and a high percentage of lead.

Port Arthur Notes

By J. J. O'CONNOR.

The Kingston School of Mining, Queen's University, has been requested by the Port Arthur Fort William Development Association to authorize the establishment of mining classes in Port Arthur. The matter is now under consideration and a decision will shortly be reached. It is probable that if the Queen's authorities are not able to grant this request, the University of Toronto will undertake to do so.

A convention numbering 81 delegates, representing every point between Port Arthur and Winnipeg, including Rainy River, met at Dryden on the 6th instant, to formulate a plan for the construction of a highway from Port Arthur to Winnipeg. The convention was a success from every point of view, and it is expected that work will be commenced in the spring of 1920. This road will give access to an extensive area of mining territory, and be of immense advantage in the prospecting and developing of mineral, agricultural and timber lands.

Mr. M. F. Fairlie, M.E., of the Mining Corporation, Cobalt, paid a visit to the Schreiber gold area, last week, for the purpose of investigating the new gold find at Victoria Lake 6 miles north of Schreiber, with particular attention to the Longworth, and Casselman-Smith claims.

MANITOBA MINES ARE PROMISING.

Mr. J. B. Tyrell Inspects the Gold Pan and Gabrielle Mines in Eastern Manitoba.

Mr. J. B. Tyrell, chairman of the Toronto branch of the Canadian Mining Institute and representative of the Anglo-French Exploration Company, Limited, has just returned to Toronto after spending some weeks looking over the properties of the Gold Pan Mining Company in the Rice Lake district in Eastern Manitoba. While there Mr. Tyrell also visited the Gabrielle property, which is the first claim staked in the district. To the "Canadian Mining Journal" Mr. Tyrrell made the following statement:

"Both properties look to be deserving of fuller exploration and development than they have yet received and the managers of the companies have asked me to direct such development as they seem to merit with the prospect of making mines of them. They have a shaft now which is about 250 feet deep. This is now being pumped out and on my next visit to the property, which will be as soon as the winter trails are ready for use, I hope to be able to make a full examination of this shaft. At the same time we are going ahead to do some development work and it will probably be necessary for us to instal a somewhat more efficient plant than is at present on the ground.

"The Gabrielle Mine will probably also be put into shape for development work this winter.

"I did not visit other portions of the district but prospectors were coming from many outlying claims with reports which are often backed up by specimens of ore from new discoveries of gold-bearing veins. Taken as a whole the district may be one that will yet give a good account of itself."

Both companies have their headquarters in Winnipeg and the directorates include many prominent business men of that city. The Gold Pan Company has been reorganized with Mr. J. H. Ashdown as president.

SODIUM SULPHATE DEPOSITS IN SASKATCHEWAN.

It is announced from Saskatoon that the sodium sulphate deposits at Lake White Shore will be commercially developed by the White Shore Chemical Company. The product, it is predicted, will revolutionize pulp making in Canada and the industry is expected to become one of the greatest of Western Canada.

METAL QUOTATIONS.

Fair prices for ingot metals in Montreal, 10th November, 1919.

	Per lb.
Electro copper	24½c
Casting copper	24
Lead	8
Tin	58
Zinc	10
Antimony	10¼
Aluminum	32

INTERNATIONAL NICKEL.

New York.—For six months ended Sept. 30, 1919, International Nickel Co. reports surplus after charges, federal taxes and preferred dividends of $510,602, equivalent to 30 cents a share ($25 par) on common, against $3,415,905, or $2.04 a share in corresponding six months of 1918.

Consolidated general profit and loss statement compares as follows:

	1919	1918	Inc.	Dec.
Earnings	$2,441,454	$7,744,128	....	$5,302,674
Other income	42,279	65,214	....	22,935
Tot. income.	2,483,733	7,809,342	....	5,325,609
Admin & gen exp.	256,104	381,843	....	125,739
U.S. & Forgn tax res.	450,475	2,749,126	....	2,298,651
Net income.	1,777,154	4,678,373	....	2,901,219
Depr & min exhaust.	999,174	995,090	$4,084	.....
Profits	777,980	3,683,283	....	2,905,303
Pfd. divs.	267,378	267,378	....	.....
Balance	510,602	3,415,905	....	2,905,303
Com. divs.	.....	2,510,076	....	2,510,076
Surplus	510,602	905,829	....	395,227

—Boston News Bureau.

THUS SHALL MEN SAY—

Thus shall they say in years to come,
When men travel again foot-free.
"Here women died, here children sighed,
By death released."

So shall men speak in lanes of France
When the poplars have grown again:
"This church they razed, this altar blazed,
A devil's feast."

Thus shall sailors whisper at sea
Where the water lies cold and green:
"Here babes were sped, here rest the dead,
Weakest and least."

Thus shall men say 'mid rounded graves
Where the rusted guns keep guard:
"Lo, here lie they, who in their day,
Destroyed the Beast."

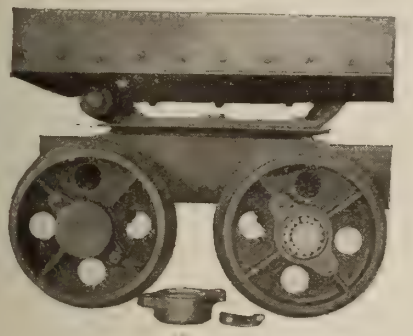
—F. W. Gray, in "Canadian Bookman."

ROLLER BEARING

MINE CARS

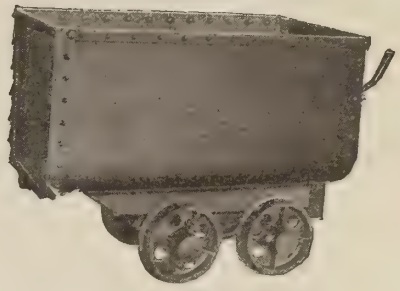
We make any type of Mine Car desired by the buyer. We also design and build special cars, if none of the standard types will suit.

Let our Engineering Department help you reduce your costs and increase your output and general efficiency.



This view shows the oil or grease retaining cap removed to show the Roller Bearings supplied on our Mine Cars.

Same car as shown above, but in Dumping position.



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MINE CARS

This is one of our many designs. Our catalog shows others—End Dump, Side Dump, and Rotary Dump. We make this car any size or capacity you want.

Send for your copy of our new Mining Catalogue.

Marsh Engineering Works, Limited

Established 1846.

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BOLINDER'S Heavy Crude Oil Engine

FOR MINING AND INDUSTRIAL PURPOSES

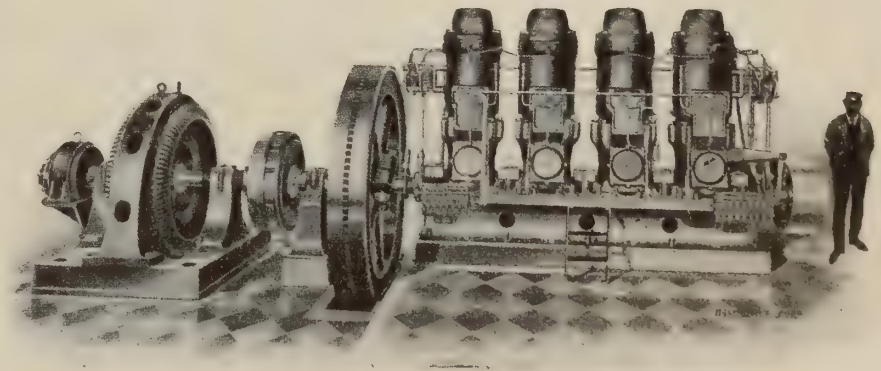
Built by a Firm who Stands Supreme in the Whole World as Oil Engine Experts.

The Bolinder operates on a cost of only ½ cent per Brake Horse power per hour—an enormous Saving as compared with a Steam plant. A 200 B.H.P. Bolinder (which is equal to a 250 I.H.P. Steam engine) costs only **$1:—per hour at full load.**

The Bolinder eliminates firemen and fire hazard.

The Bolinder is the result of 30 years' experience.

Simple
Reliable
Durable



A 320 B.H.P. Bolinder Engine directly connected with a Generator.

Representatives:—

Swedish Steel and Importing Co., Limited, Shaughnessy Building, MONTREAL

TORONTO BRIEFS.

Items of interest gleaned amongst the mining offices—What is going on in various northern properties.

From Our Staff Correspondent.

The head offices of Associated Gold Fields, this city, announced this week a valuable strike of high-grade ore on the properties of the company at Larder Lake. Being concerned with the blocking out of enormous tonnages of average-grade ore, the company does not stress its high-grade discoveries, but they claim that the latest find is of noteworthy width and richness. On the 500-foot level of Block B, in the west cross-cut of the south drift, a very rich patch is said to have been encountered. The company states that five feet assay $118 a ton, the next five feet $80 a ton and the adjoining 15 feet, not yet assayed, show gratifying amount of free gold. The patch is opened up 25 feet in the cross-cut.

It is reported in mining circles here that negotiations between the Timiskaming and the Buffalo Mines, whereby the former should take over the latter, appear to have failed to reach the desired conclusion. There is another report in circulation and that is that the Mining Corporation, as well as the Northern Customs Concentrator Company, are making a bid for the Buffalo properties. There are also rumors that the Mining Corporation is after the Thompson-Krist in Porcupine.

A. S. Fuller, a Cobalt mining broker, is completing arrangements for the reorganization of the Porcupine-Premier, formerly known as the Standard Mine, a property that conducted a very active development program some years ago with encouraging results.

Hollinger Consolidated created considerable interest in Toronto mining circles this week by making a record shipment of bullion valued at about $175 000. This was said to be the result of an eight days' run and it is understood that it is the company's intention to keep the future production around these figures.

J. P. Bickell, president of the McIntyre-Porcupine, is quoted as saying that the mine is expected to realize a net profit of a million dollars during the current fiscal year, one-third of which is already passed. This would compare with $839,000 during the past fiscal year. R. J. Ennis, manager of the McIntyre, declares that ore will average about $11 during the current fiscal year and that costs will average about $5 a ton, leaving $6 a ton net profit. The statement of the company appears to hold out the assurance that interim dividends of 5 per cent at intervals of about every four months can be paid as well as the accumulation of a larger surplus.

News from Porcupine is to the effect that the sampling of three veins being developed on the first level of the Clifton-Porcupine indicate that the work is being carried on in an excellent grade of ore. As a general rule it has been found that the gold content increases as drifting progresses north.

Digby Grimstone, a well-known prospector, has just returned to Porcupine from Painkiller Lake district, where he has been doing considerable development work. His properties are located between the Premier and the Hattie mines. On the Grimstone properties he reports a very promising vein about fifteen inches to three feet wide which has been traced from three to four hundred feet on the surface. There is apparently a great deal more development work going on in this section of Northern Ontario than is generally known. It is learned that the Premier mine has now got its shaft down 250 feet, at which depth cross-cutting is being carried out to cut the ore body which is indicated along the surface. The company is contemplating the erection of an up-to-date plant, as results of development work to date have been very satisfactory.

GOLD PRODUCTION DECREASED ONLY TWO PER CENT.

Interesting figures on mining activities culled from annual mining report of the Timiskaming & Northern Ontario Railway.

The annual mining report of the Timiskaming & Northern Ontario Railway, shortly to be issued, contains some interesting comment and statistics concerning mining activities. The report states that gold production for 1918 only decreased 2 per cent from the previous year and declares that "the necessity for keeping up, or even for increasing the production of gold is conceded by world statesmen and financiers, but how to do this in the face of increased costs is a problem for which the solution is still being sought."

The report shows that at the end of 1918 some 17 mines were equipped with mills for treating ore, with a capacity of 6,660 tons daily while only about 2,490 tons were then being treated. A summary of the position of Hollinger Consolidated Company is also given, in which it is shown that the consolidated companies up to the end of 1918 had produced $25,933,910 from which net profits of $13,379,074 were realized and dividends amounting to $9,424,000 paid. During the year 1918 some 22 mines of Cobalt shipped an aggregate of 17,911 tons of ore as compared with 20 companies shipping 19,016 tons in 1917.

During 1918 the Buffalo was the leading shipper, sending out 3,842 tons, followed by the Nipissing with 2,620 tons and the Mining Corporation with 2,264 tons. In 1917 the Nipissing was the leader with 3,539 tons followed by the Mining Corporation with 2,230 and the McKinley-Darragh with 2,123 tons. According to the figures in the report the mines of Cobalt up to the end of 1918 had sent out an aggregate of over a quarter of a million tons of ore; this in addition to the large tonnage treated locally.

Of the total of 266,734 tons shipped, the Nipissing was the leader with 39,650 tons, followed by the La Rose with 38,403 tons and the McKinley with 26,345 tons.

TRETHEWEY SHAREHOLDERS RATIFY DEAL.

At a special meeting of the shareholders of the Tretheway Silver-Cobalt Mines, Limited, held in the Standard Bank Building, Toronto, on Nov. 7th, a new stage in the history of the mines began, when the agreement for the purchase of the Castle stock of 1,000,000 shares and of 112 acres of water leases and the option of the Major claims of 40 acres, was ratified. All these are close together in the Gowganda district and while prospecting has not yet proceeded far, it is believed that there is sufficient silver to greatly extend the life of the Trethewey. Already the company has spent $150,000 in development work on the Castle property. The Trethewey had previously secured one-third of the Castle shares and now gets the remaining two-thirds in exchange for 500,000 shares of Treasury stock. Half a million shares was represented at the meeting by proxy.

EDITORIAL

"Who's Who in Canada and Why"

The Montreal "Journal of Commerce" has the following to say about the new edition of the Canadian "Who's Who:"

"The 1919-20 edition of "Who's Who and Why," edited by B. M. Greene and published by the International Press, Limited, Toronto, has made its appearance. It contains nearly 4,000 sketches, which is probably about the number of Canadians who are really entitled to inclusion in such a work of reference. For those who are concerned with industry, commerce and finance the list will be found fairly complete, though we note with some surprise the absence of Mark Workman, Sir Henry Pellat, Sir William Mackenzie, Hon. W. E. Edwards, F. Orr Lewis, W. I. Gear, F. H. Anson, Shirley Ogilvie, W. H. Moore, Dr. Milton Hersey, George Chahon, Jr., to mention only a few names which come to mind in connection with the world of directorships and business enterprise.

"But it is when we come to learning and the arts that we find the blank spaces most notable—blank, indeed, so far as the men who should be in a "Who's Who" are concerned, but filled up so far as type goes with the names of people whom few if any students of such a volume are ever likely to turn up. Out of 50 consecutive names in a portion of the book selected at random, 40 are company directors or managers with no other claim to fame, three are public officials, one is the principle of a ladies college, three are politicians, one is a publisher and editor, one is a judge and one (this is really astonishing) is a librarian. It is not possible, surely, that four-fifths of all the genuine attainment of Canadians is in purely business spheres and none of it in learning, literature or the arts."

We would add that judging from an inspection of the work there appear to be no men of note in the mining world of Canada. Of recent presidents of the Canadian Mining Institute we do not find included Mr. D. B. Dowling, or Mr. A. A. Cole. Practically no members of the Geological Survey are included. Dr. Ami, Theo. Denis and Dr. Miller are names we cannot find. The Fuel Controller, C. A. Magrath is not included, although the Assistant Fuel Controller, Mr. C. W. Peterson, is included. There is not to be found the name of a single superintending official of the Dominion Steel or Coal Companies. In Nova Scotia we miss the inclusion of such representative Canadians as Major the Rev. John Pringle, Moderator of the Presbyterian Assembly, and not unknown in Canada; the venerable Speaker of the Nova Scotia Legislative Assembly, the Hon. Mr. Goudge, and such persons as Prof. Sexton of Halifax, lately honored by Queen's University, the late George Gray of Stellarton, a most representative Nova Scotian, and the Hon. Robert Drummond. Even D. D. McKenzie, for a time leader of the Opposition at Ottawa, is not included.

The "Canadian Bookman" says: "Since the last publication of the late Mr. Morgan's admirable work, which is now many years old, we have no Canadian "Who's Who" except a volume to which admission can be procured by practically anybody upon payment of $25, $50 or $100, and from which practically all distinguished Canadians who do not care to part with such a sum are sternly excluded."

So far as regards men of eminence in the mining profession is concerned, "Who's Who in Canada" is not a complete source of information.

The Levant Disaster

The disaster at the Levant Mine, by which 31 men were killed, and 11 very seriously injured, is one of the worst in Cornish annals, and will excite sympathy from emigrant Cornishmen and their descendants who are represented in every rock-mining camp the world over. The accident was of an unusual nature, said to be the only case of fatal accident from failure of a man-engine of this primitive type that has occurred in England. In this issue will be found an interesting historical summary of the Levant engine taken from the "Mining Journal" of London.

There are several examples in Nova Scotia of Cornish pumping engines, of the rocking-beam type, not now in use, which were installed by the General Mining Association in the early days of the coal-mining industry there. Those who have had to deal with fallen pump-spears know the damage they can create in a wooden-timbered shaft, and in the Levant case the work of rescue must have been most difficult and very dangerous, but aid came from every neighboring mine.

GAS IGNITION BY SPARKING.

The "Colliery Guardian" is an old-established trade paper whose editorials are always worth reading, and in this issue we reproduce an editorial which is in effect a summation of what is known, or more correctly what is not known, regarding the ignition of mine gas and dust clouds.

The reference to the possibility of sparking originating from frictional electricity is interesting when considered in relation to the recent dust explosion at the Port Colbourne grain elevator. Canadian readers will also be interested in the parallel drawn between the behaviour of a certain roof strata in the Minnie Pit, where 155 men lost their lives by a dust explosion, and the occurrences reported by Mr. J. T. Stirling and Sir John Cadman after investigation of the circumstances attending the Bellevue Mine explosion in Alberta.

The incident reported by the Chief Inspector of Mines for India, in which a flash of lightning ignited an explosive mixture of gas and air, is reminiscent of a well-authenticated incident in the Pictou Coalfield in 1893 mentioned in Hon. Robert Drummond's book* on the mines of Nova Scotia. "During an electrical storm lightning ran down the shaft, the hoisting steelrope acting as a conductor. The lightning set the gas on fire, but did little other damage. The fire did not continue." The two occurrences seem fairly parallel.

While no very definite conclusions are expressed by the writer in the "Guardian", one thing grows increasingly plainer as successive colliery explosions occur, which is, that coal dust represents the greatest danger to life of any conditions existing underground. It is the chief predisposing cause of colliery explosions, and when these disastrous phenomena occur, it becomes the chief agent of their extension and propagation.

In the Minnie Pit explosion, as in the Port Colbourne disaster, and in thousands of other explosions that could be cited, there may have been frictional electricity, or unsuspected sparking from siliceous rocks, or other obscure and little understood phenomena, but, if the dust cloud had not been there, there would have been no explosion.

THE MINERAL WEALTH OF NEWFOUNDLAND.

Apropos of the contention in the "Journal" of October 1st that Newfoundland badly needs a government geologist, the "Mining Journal" of London gives prominence to an interview with Sir Edgar Bowring, High Commissioner of Newfoundland, upon his return to London, which it will be noted is in general agreement with these contentions. The "Mining Journal" correctly summarises the situation when it states that Newfoundland "does not yet know what she possesses in mineral wealth". A quotation from the interview seems timely and is given below.

"One of the most promising of Newfoundland's future prospects is connected with the wide and varied mineral wealth located from time to time, and it is strongly felt that the attention of enterprising mining pioneers, provided with adequate capital, would commence an era of great prosperity.

"The geological age of the Newfoundland rocks is largely pre-Cambrian, with Cambrian, Silurian, Devonian, and Carboniferous series, subsequently greatly planated by ice-action in post-Pliocene time. Whether the occurrence of fossil forms intermediate between those of America and those of early Palaeozoic Britain justifies the view that Newfoundland is a palaeontological stepping-stone between the two Provinces is a question for the specialist. What is certain is that the mineral wealth of the country is varied and great, and that it goes far beyond the copper, which, as our readers are aware, has been extensively worked since 1864, and the iron deposits which have been vigorously worked for many years by the great Canadian coal and iron companies. Chromite, nickel, antimony, lead, manganese, gold, and silver occur generally over extensive areas, and the coal deposits, which are expected one day to give a large output, have been sufficiently proved to warrant the most favourable expectations. The extent of the deposits at Codroy Valley and Bay St. George, to mention two of the coal-bearing areas, has not yet been accurately determined, but it has been proved that a huge Carboniferous syncline or trough underlies practically the whole of the Bay St. George district. The coal is of excellent quality, and one of the seams in the latter area is 4 ft 2 ins. in thickness. Oil shale also exists, and oil is produced, but it is noteworthy that the electricity produced by water-power is cheaper as a luminant than oil, and is used even in the smallest towns.

Notwithstanding that many reports have been made as to individual districts, Newfoundland does not yet know what she possesses in mineral wealth. A geological survey is now in progress, which will doubtless add materially to our knowledge."

If, as is stated, an adequate geological survey of Newfoundland is in progress, there can be little doubt but that the reward will be in exact proportion to the effort expended, and the announcement, if confirmed, is welcome and encouraging.

"If he play, being young and unskilled, for shekels of silver and gold,

Take his money, my son, praising Allah. The kid was ordained to be sold."—Certain Maxims of Hafiz.

"From the strictly national point of view, dependence on another nation for an indispensable raw material spells subservience, unless the dependent nation is prepared to face the consequence of a stoppage of the importation of this raw material.

"The dependence of Central Canada on United States coal is a cogent reason for the development of the coal mines of Nova Scotia to a point where, should for any reason the coal supply of central Canada be imperilled, the mines of our eastermost province could fill the breach."

—Extract from a memorandum prepared by the Editor, about 1916, for submission to Sir George E. Foster, Minister of Trade and Commerce.

* Minerals and Mining, Nova Scotia, pp. 343, q.v.

THE VANCOUVER MEETING OF THE CANADIAN INSTITUTE OF MINING AND METALLURGY, NOVEMBER, 26th. 1919.

Vancouver members of the Institute are working very hard in preparation for the shortly ensuing C. M. I. Meeting in Vancouver.

The Committees have been arranged, and are as follows:

Secretary Manager: Dr. E. T. Hodge, Professor University of British Columbia.

Banquet Speakers: Mr. Chas. Camsell, Director Western Branch Canadian Geological Survey.

Banquet Arrangements: Mr. S. W. Miller, Broker.

Resolutions:—Mr. J. M. Turnbull, Professor University of British Columbia.

Reception: Mr. W. M. Brewer, Resident Engineer.

General Entertainment: Mr. J. L. Parker.

Accommodation: John D. Kearns, President Rotary Club.

Luncheons and Mineral Exhibit: Kenneth Robinson, Boring Contractor.

Machinery Exhibit: S. J. Crocker, Mining Equipment.

Finance: Mr. Nichol Thompson, Manufacturers' Agent.

Automobiles: G. S. Eldrige, Chemist.

Ladies: Mrs. Keneth Robinson.

Smoker: Bradford W. Heyer, Editor B. C. Financial Times.

Stenographic: T. J. McIlveen.

Press: F. E. Payson, Pacific Coast Manager, Canadian Mining Journal.

The Mayor of Vancouver, on behalf of that City, is sending a personal invitation to every member of the Institute to attend the meeting.

Judging by the tone of the communications that are reaching the office of the "Journal," the West is calling this time in earnest, and if those who attend the Meeting are not given a thoroughly enjoyable time it will not be the fault of the Vancouver Committee, who are out to do just that.

Advance list of Papers.

The following is the list of papers expected to be read, subject to addition and changes:—

Wednesday, 26th November.

The Future of the Coal Industry in Alberta, O. E. Whiteside.

The Cassidy Colliery, Vancouver Island, E. G. Wilson.

The Future of the Coal Industry in the State of Washington, F. M. Freeman.

Thursday, 27th November.

Hydro-Metallurgy of Copper Sulphides, Wm. E. Green.

Treatment of Copper Ores, E. P. Mathewson.

New Methods of Hydro-Metallurgy in the Treatment of gold and silver, N. W. Freeman.

Taxation of Gold Mines, Frederick Bradshaw.

Geological Methods as applied at Butte, Montana.

Some interesting Geological Problems, D. C. Bards.

New Mineral Discoveries in the Stewart District, E. E. Campbell.

Friday, 28th November.

Platinum in British Columbia, R. W. Uglow.

Making up a Matte, H. N. Thompson.

Relations which should exist between the Government and the mining industry, R. W. Brock.

Union Among Technical Men, J. M. Turnbull.

Saturday, 29th November.

Trip to Nanaimo and Cassidy Mines.

Trip to Britannia mills and mines.

Trip to Clayburn.

Note: Owing to the indifferent rendering of the telegram transmitting the above particulars, the titles of papers and names of authors are probably not quite accurately given.

DOVER WELL NOW PRODUCING GAS AND OIL

The "shooting" of the deep well of the Petrol Gas and Oil Company in the West Dover district, Ontario recently was very spectacular. The bore is 3,382 feet deep, and 150 quarts of nitro-glycerine were used in the shooting operation. Oil was sprayed by the explosion over great distances. The well is now producing steadily 2½ millions cubic feet of gas and 200 barrels of oil per 24 hours. The Petrol Company was advised by Dr. N. Y. Williams of the Geological Survey, whose paper in the "Journal" of September 3rd will be recalled by our readers.

Dr. Williams in referring to the Trenton formation in which this well is situated characterises it as "perhaps the most alluring and at the same time the most illusive of the oil and gas bearing formations of Ontario."

To Dr. Williams' study of this field, and the application of his knowledge in directing the position of wells, much of the success which has been obtained is due.

Geological research always pays, and pays exactly in proportion to the effort and time expended thereon.

METAL QUOTATIONS.

Fair prices for ingot metals in Montreal, 19th November, 1919.

vember, 1919.

	Per lb.
Electro copper	24c
Casting copper	23½c
Lead	8c
Tin	57½c
Zinc	9¾
Antimony	10⅛c
Aluminum	32c
Steel Bars	$3.10
Plate	$3.35

PERSONALS.

Mr. J. J. Harpell and Mr. F. W. Gray, expect to attend the Vancouver meeting of the C. M. I. next week.

Mr. George E. Leighton, for many years the Canadian representative of the Hardy Patent Pick Company, who recently returned from a trip to England, has joined the Canadian branch of Samuel Osborn & Co., of Sheffield, England, as Vice-President. Mr. Leighton will continue to represent the Hardy Company in Canada.

Mr. R. J. MacLean of MacLean and Barker has returned to Montreal from England. Mr. MacLean has charge of the eection of a large turbo-compressor installation at the Springhill Mines of the Dominion Coal Company.

The Crude Oil Engine and its Adaptability to Mining Conditions

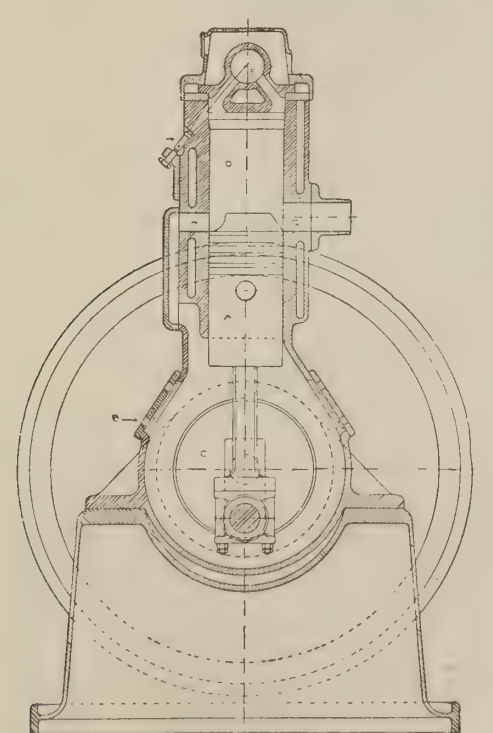
The crude oil engine has during the last ten or fifteen years been developed and perfected, and as a result it is today gaining a very extensive use, even where the highest degree of efficiency and reliability is required. For marine purposes it has become a very serious competitor to steam, and it is only a question of time when the oil-engined vessel shall have driven the steam-engined vessel off the seas. The full Diesel-type engine is at the present time installed as prime mover in many vessels of up to 14,000 and 15,000 tons, while the semi-Diesel engine, which is being built in units up to 500 and 600 b. h. p., is extensively used for smaller craft, full-powered motor-ships of up to 4,000 or 5,000 tons capacity, as well as auxiliary sailing vessels, barges, tug boats, etc.

During the War the semi-Diesel engine was used rather extensively by the British Admiralty. A number of motor-monitors were, for instance, equipped with Bolinder surface-ignition engines, and other classes of vessels were similarly equipped.

Also for stationary purposes, engines both of the Diesel and semi-Diesel type are now being used quite extensively, particularly for municipal lighting plants, and as power equipment for mines and other industrial establishments, where cheap water power is not available. The oil engine is no doubt the most economical power equipment that can be found.

The Diesel engine consumes about 0.45 lbs of oil per b. h. p. per hour, while the semi-Diesel engine consumes slightly more. With fuel oil worth today on the Canadian market about six cents per gallon, a semi-Diesel engine of, for instance, 100 b. h. p. will not cost in running expenses more than 50 cents per hour, or $5.00 for ten hours, and all other sizes of engines in proportion. This is, as will be seen, a very low cost as compared with a steam plant.

The oil engine also offers several other advantages. It does not require firemen. One man per shift is enough to operate even large units. It eliminates fire hazard, which is an enormous advantage, particularly in certain localities. It does away with hauling and shovelling coal. The fuel oil can be taken through a pipe line from the tank car on the railroad siding to the fuel tank at the power house, from which it is automatically pumped up to the fuel service tank in the engine room.



Section thru 320 H.P. Bolinder Engine.

For stationary purposes the semi-Diesel engine is generally adopted in preference to the full Diesel type. The latter is rather intricate, with a working pressure three times that of the semi-Diesel type.

The endeavor has been to simplify as much as possible the design of the semi-Diesel engine and to make it with as few working parts as possible, so that it might be operated with only the ordinary amount of care and attention required by a steam engine.

The accompanying sectional view of a 320 b. h. p. Bolinder engine illustrates the simplicity of design of this well known semi-Diesel type engine. The engine is of the two-cycle surface-ignition type and the working cycle is briefly as follows:

When the piston "A" at the end of its downward stroke is moving up towards the ignition chamber "E" the necessary air for scavenging and combustion is drawn through the air valves "B" into the enclosed crank case, and at the same time the air in the cylinder "D" is being compressed. When the piston "A" has reached its extreme upward position, a certain amount of oil is injected into the ignition chamber "E" through the nozzle "F," and the fuel charge ignites, resulting in the expansion of the gases driving the piston downward toward the shaft.

During this downward stroke of the piston, the air in the crank case is compressed. As the piston nears the end of its stroke the exhaust port "G" opens, and immediately afterwards the inlet air port "H." The burnt gases escape through the exhaust port "G," while the compressed air in the crank case, entering the cylinder by the air port "H," completes the scavenging work and furnishes the cylinder with air necessary to make up the next charge in the cylinder.

Low grade oil can be used as fuel, provided that it contains not less than about 18,000 b.t.u. per pound. Instances can be given where oil containing as high as 25 per cent asphalt has been used to advantage. A lighter oil is naturally to be preferred.

As to the durability of the oil engine, it has been established that engines of a good make will give satisfactory service during a great number of years with comparatively light repair bills. At an oil engine plant in a Canadian town it was surprising to learn recently that the engine had been in operation for over four years without the cylinder heads having been removed or the engine cleaned, and still the engine was running very well. Such a treatment of an engine should naturally not be encouraged, but it serves to show the dependability of this kind of equipment.

When using the oil engine in connection with electric generators it is advisable to have the generator directly connected with the engine, and by equipping the engine with a synchronizing device, two or more engines with generators attached can be run in parallel.

Some notable installations of this kind have been made during the last few years, and investigation of their applicability to mining conditions is to be recommended.

GAS IGNITION BY SPARKING.

The last report of the Chief Inspector of Mines in India contains an account of a remarkable explosion of fire-damp caused by a discharge of lightning in the new shaft at the Sitalpur coal mine, belonging to the Bengal Coal Company. The explosion occurred during a thunderstorm, and the evidence showed that a flash of lightning had, to all appearances, passed down the shaft causing disruptive discharges at certain points between the guides and the winding rope, rending the latter at two places situated respectively 228 ft. and 278 ft. from the surface. The distance between the winding rope and the side of the shaft was 5 ft. 4 in., indicating a spark gap of this width, and an intensity of discharge which could not fail to ignite the explosive mixture of gas and air known to be present in the shaft. There is apparently no limit to the vagaries of lightning, and the occurrence, rare as it is, presents no element of mystery.

It is, nevertheless, highly interesting as indicating possibilities; and one is naturally led to remember a considerable number of cases in which mysterious explosions have occurred in pits under conditions where human agencies seem to be excluded. In 1915, M. Ferey described in a paper read before the Société de l' Industrie Minérale phenomena of a similar character to the above. In a pit liable to sudden outburst of gas, for the sake of safety, shot-firing was carried out from the surface. During a storm, in the year 1905, shots went off in two places after the detonators had been connected to the conductors. These shots were situated respectively 1,490 and 1,410 metres from the firing station. Realizing the possible danger from this cause, the precaution was taken to cut the conductors at the bottom of the shaft and to connect them just before firing. Even under these conditions a shot went off spontaneously, owing, it is believed, to lightning. In explaining this phenomenon, M. Ferey says that it is necessary to remember that the electrical conductivity of the earth is not perfect, and that the capacity of a conductor is more effective if its extremity is earthed; while a comparatively feeble current is sufficient to explode a detonator.

We may, however, travel beyond the comparatively intelligible circumstances of lightning flashes during thunderstorms and consider certain more speculative views respecting the development of electrical conditions possessing elements of potential danger in coal mines. Let us begin with the electrification of dust.

In an illuminating paper, read by Mr. W. A. Douglas Rudge before the Royal Society of London, it was shown that the mere raising of a dust cloud produces a large amount of electricity, the sign of which depends upon the material used. Generally, acid particles become positively and basic particles negatively electrified. Again measurable charges of electricity are produced when particles of quartz, felspar, mica and other substances are rubbed against other particles of their own kind. Thus quartz rubbed upon quartz causes the particles to be positively electrified, and at the same time a negative charge is given to the air. Previously, in 1901, Hesehus had shown in Russia, that pieces of the same material when rubbed together become electrically charged with the same sign, while the dust abraded in the process receives a charge of an opposite sign. These charges are sufficiently persistent to be measurable with a suitable electroscope. Thus a puff of air containing 5×10^{-9} gr. of dust of mercuric sulphide gave a charge to a collector of several volts; while a centigramme of corn-flour, blown into a large room, charged the air to an extent which raised the charge on a collector to a potential of 200 volts, and the effect persisted for some time. The exact explanation of these phenomena is not clear, but the effect seems to be due to surface contact or friction. Neither is it at once apparent in what way these experiments can have any bearing upon pit explosions.

But interest in such phenomena is re-awakened by the evidence recently given in connection with the Minnie Pit enquiry at Halmer End just concluded. In the course of this investigation evidence was given as to the remarkable behaviour of the roof of the Bullhurst seam, known as Bulldog, which by rubbing under earth strain in the roof, and also by falling upon similar pieces on the floor, developed flares and flashes which seem to be different from ordinary friction sparks, and were referred to by Dr. Wheeler in his evidence at the enquiry, as frictional electricity sparks.

We do not propose to express any opinion just now upon the theory of sparking of the Bulldog as the possible cause of the Minnie pit explosion. It is interesting, however, in this connection, to recall the circumstances attending the Bellevue explosion, Alberta, occurring at intervals between 1910 and 1911, some of which took place when nobody was in the pit. These were investigated by Mr. J. T. Stirling and Sir John Cadman, and are believed to have been due to sparks produced by falling stones, a view which was supported by the fact that a large fall of rock marked the point of origin of one of the explosions. Experiments showed that the hard siliceous roof gave a brilliant display of sparks on falling, and when struck by a hammer the surface of percussion glowed red hot for an instant, owing probably to the ignition of bituminous matter in the stone. The sparks obtained by friction of one stone upon another could be made to ignite coal gas, a result which has not yet been obtained with the Bulldog of the Minnie pit. Negative laboratory experiments of this kind, however, are scarcely conclusive, because it is impossible to deal with such large masses of material as are concerned in falls of roof in the mine. The problem is also complicated by the possibility of electrical action, as suggested by Dr. Wheeler in his evidence at the Minnie pit enquiry, and there is clearly a case for further enquiry as to the possibility of firing methane by rock sparking on what we may term the grand scale. There is no reason to doubt the evidence brought forward by eye witnesses as to the remarkable character of the sparks seen in the Minnie pit. The length of flame alone seems to preclude the idea of more frictional sparks, and if they were in fact of an electrical nature, a temperature exceeding the ignition temperature of methane might easily be reached. We may, in fact, recall the circumstances of the explosion at the Maindy pit, Glamorganshire, on November 8, 1896, where a similar explanation seems to be sufficient to account for the occurrence.

It is unfortunate that in investigations of this character it is generally necessary to rely upon the method of exhaustion of other possible causes, a perfectly sound procedure when all the factors are known, but a dangerous practice where knowledge is incomplete.

—"Colliery Guardian."

THE DISASTER AT THE LEVANT MINE, CORNWALL, ENG.

Failure of Cornish-Beam Man-Engine.

A very serious disaster occurred at the Levant mine on Monday last, involving the loss of at least twenty lives, and probably considerably more, as well as of injury to others. This is the most serious accident which we can remember to have occurred in Cornwall, and the circumstances under which it took place are equally remarkable. The cause of the disaster was the breaking of the connection between the engine and the reciprocating rod or beam which works in the shaft, and constitutes the man engine. Reference was made to the Levant man engine in a recent article in this paper describing a visit to the Levant mine, and it is the only machine of the kind working in this country and, perhaps, in the world.

While the man engine is generally spoken of in these days as a survival of a peculiar primitive character, it is interesting to note that at the time of its adoption in Cornwall it was generally preferred by the men to the skip winding then employed in collieries and other mines, and at Levant to-day the ore is wound in ordinary skips while the men use the man engine. The man engine was first introduced in the Hartz at the Spiegelthal mine, working to a depth of 110 fathoms. This was in 1833, and in a short time numerous other mines became similarly equipped. The principle was advocated in Cornwall by Mr. Charles Fox in 1834, and the first installation was put in at Tresavean, and put to work in January, 1842. A year and a half later it had been extended down to the 200-fathom. In 1845 a similar engine was installed at the United Mines, working to a depth of 210 fathoms. Both these engines were worked with double beams, the miner in travelling stepping alternately from one to the other. In 1851 a new system was installed at Fowey Consols, consisting of a single oscillating rod, with sollars on either side. Three single-rod engines were erected in this decade: Fowey Consols, 280-fathom; Dolcoath, 220-fathom; and Levant, 200-fathom. The rods of the man engine were made of Norway pine, in average lengths of 36 ft., joined together like pump rods, the stroke of the engine in all cases giving a travel of 12 ft. In Hunt's "British Mining" it is explained that owing to the great improvements made in the pumping plant in the early years of the nineteenth century mines were deepened rapidly, and the exertion of reaching lower levels by ladders was more than the older men could endure, and consequently that some form of mechanical haulage became necessary. The question was taken up by Mr. Michael Loan, who suggested following the example of the collieries and winding the men by ropes. The miners, however, would not accept the idea of being "brought up like coal and rubbish," and objected that if the ropes broke they would be killed. In consequence of this the idea of winding was given up and that of the man engine rod adopted. One of our correspondents, writing to the "Mining Journal" in 1860, argued strongly in favor of the man engine as follows: "During the last few years a notion seems to have been growing in Cornwall that the mechanical raising of men from deep mines is to be finally accomplished not by man engines but by safety skips, or some other modification of the system now in use in coal mines. Now we all know the dangers attending this system even in collieries where the shafts are always perpendicular, and it consequently is an extremely doubtful question whether in incline shafts skips could ever be made sufficiently secure to be entrusted with human lives." He then proceeds to examine opinions expressed by the French Government expert, M. Moisennet, in a report on Cornish industry, in which he expressed the opinion that man engines were not only infinitely safer but much more economical, and likely eventually to supersede the winding system in use in collieries.

Curiously enough, although the Levant man engine has been working over sixty years, to say nothing of the plants in the other four mines, there does not appear to be any record of a similar accident in this country, or indeed of any accident at all involving more than the loss of one life; that is to say, due to individual carelessness of the men travelling, though there can be no doubt that to the novice using the machine for the first time an impression of great risk is conveyed. On the other hand, in Germany two similar accidents occurred in the eighties, in each of which eleven men lost their lives. Consequently, the immunity from serious accident which has characterized the man engine in this country appears to a large extent to have been a matter of good fortune and careful supervision of material rather than inherent in the system.

As to exactly what happened at Levant, as well as the magnitude of the disaster, full particulars are still wanting. It appears to be believed that the engine rod parted from the beam of the engine on the completion of the upward stroke, and that the whole beam then fell down the shaft, according to one account, to the bottom. The bottom of Levant is, we believe, about 330 fathoms deep, but how far the bottom of the beam is from the lowest point in the shaft we are not aware. The shock of the fall broke the beam in several places, and these sections falling in the shaft swept the sollars until they were wedged with debris and stopped. The most serious destruction was wrought in the upper part of the shaft, and no one was killed below the 140-fathom.

At the time of the accident the shifts were changing, and the beam was carrying a fairly full complement, so that the accident occurred at a moment when the effect was most serious. The mine possesses ladder-ways in the pumping shaft, and, of course, there is the skip shaft through which all the stone is wound but it is not suitable for hauling men in the ordinary way. The great difficulty which has to be encountered in rescue work is the difficulty of reaching men who may be jammed in the shaft, which necessarily takes a long time to clear, and there is reason to fear that the number of casualties may reach considerably higher than is at present known, and that many of the injured must have suffered greatly before they could be reached.—"Mining Journal."

ECONOMIC DEPENDENCE SPELLS POLITICAL SUBSERVIENCE.

Canada should be in a position to meet her own coal needs from her own coal mines. Canada's status as a nation will never be fixed until every effort has been made to make this country self-supporting. That our present condition of subservience to a foreign nation, however friendly at this time, reflects the Canadian spirit, cannot be asserted in the presence of our victors returned from the great war.—"Montreal Star."

Our Northern Ontario Letter

The achievements of some of the leading silver mines in the Cobalt field during recent weeks directly reflects the strong position of commercial bar silver. The value of the output in a number of instances is reaching new high levels. As an instance of this is the Nipissing, which, as pointed out last week in the Journal is producing at the rate of upwards of $500 every twenty-four hours.

The Mining Corporation of Canada has secured an option on the Buffalo, and is proceeding with an examination. At the time of writing, the consummation of a deal would appear to be probable. Lying adjacent to the Townsite property of the Mining Corporation, and containing a large quantity of low grade ore as well as possibilities of favorable developments, the Buffalo mine would appear to be a valuable acquisition to the Mining Corporation.*

In connection with the Buffalo Company, itself, a meeting is called for to-morrow (Nov. 20th) for the purpose of authorizing another reduction in capital The company was originally capitalized at $1,000,000 divided into 1,000,000 shares of the par value of $1. each. Two years ago the capital was reduced to $750,000 by paying shareholders 25 cents a share, and thus reducing the par value to 75 cents. Last year a similar reduction was made, thus leaving the company with $500,000 capitalization, made up of 1,000,000 shares of the par value of 50 cents each. To-morrow's meeting is for the purpose of authorizing payment of 35 cents a share, thus reducing the capital to $150,000 made up of 1,000,000 shares of the par value of 15 cents each.

The Lumsden Mine has been taken over by C. L. Campbell of Montreal, who announces that he is having the workings pumped out preparatory to making an examination. It is planned to thoroughly develop the property. Exploration work carried on several years ago resulted in one shipment of high grade ore being made. Sinking was carried to a depth of 400 feet with drifting and cross-cutting at four levels. This deal was referred to last week, the name of the "Drummond" being erroneously mentioned, and lacking the official details above given. Major Rattrey, formerly of the Borden Battery will have charge of operations.

The Penn-Canadian has evinced a desire to secure the Bailey-Cobalt mine on a fifty-fifty consolidation basis. The Penn-Canadian is equipped with a first class mining and milling plant as well as a fair amount of ore left in the mine, and with a tailings pile amounting to about 200,000 tons and estimated to contain around 750,000 ounces of silver. An attractive feature of the offer is the fact that the development of the Bailey-Cobalt could be proceeded with without any delay or expense in that the Bailey was orginally opened up under lease through the workings of the Penn-Canadian and is connected up on all levels, with the exception of the lowest level. Last week, the offer of the Northern Customs Concentrator Company through A. J. Young, came up before the Master in Ordinary in Osgoode Hall, Toronto, but objections were raised by the so-called minority interest with the result that the case was enlarged until today (Nov. 19th). It now develops that the minority interests claim to really control the Bailey. They appear to base this on the fact that the books of the company have been closed for over five years, and the present so-called majority interests are alleged to case their claim on the books as of five years ago.

The shareholders of the Trethewey having ratified the deal to acquire the Major property in the Gowganda district, as well as a lease of 112 acres under Miller Lake, the holdings of this company taken on added prospective value in which enters an added element of speculation. In view of the success met with on the adjoining Miller Lake-O'Brien Mine, the proposition is attractive.

Underground operations have been assumed at the Peterson Lake. The indications are, however, that no effort will be made at this season to treat the large pile of tailings from past operations and upon which appears to rest the best chances of commercial operations.

The Provincial is stated to have developed a considerable tonnage of low grade ore during recent months, although the importance of this has not yet been demonstrated.

At the Genesee property, a faulted zone has been encountered at a depth of 500 feet where lateral exploration is being carried on. Over a width of about seven feet assays show an average silver content of four ounces of silver to the ton. Although this is slightly below commercial grade, yet it indicates that operations are being carried on in the zone of enrichment and is pointed to as a promising development.

Philadelphia interests are still considering the advisability of opening the Silver Hill property, but, as yet, no definite announcement has been made. The property lies between the north-east part of the Nipissing and the Silver Bird property of the O'Brien.

During the month of October the Kerr Lake Mine produced 112,000 ounces of silver, the output being the highest for several months. This is at a rate of close to the average monthly output during the fiscal year ended August 31st when a total of 1,482,649.40 ounces was produced.

During the month the price of silver averaged close to $1.20 an ounce lending an estimated value of about $134,000 to the October production. This is at the rate of about $1,612,800 a year, as compared with gross profits of $1,637,143.71 during the past fiscal year, of which $956,258.19 was net profit.

The Kerr Lake has put into practice the proposed system of workmen's committees, the personnel of which is men employed by the company. The new plan promises to give the utmost satisfaction.

It will be recalled that during the labor strike of last summer the mining companies refused to recognize the Western Federation of Miners, but made a proposal to the men that if they returned to work the companies would agree to the men forming workmen's committees at individual mines and in this way discuss with the management matters concerning the welfare

*Note: A later announcement by the officials of the Mining Corporation of Canada states that it has bought control of the Buffalo Mines Limited. No further particulars of the transaction were given, except that the reported purchase price of $300,000 was incorrectly stated.

of the employees. Later on, after such individual committees are formed throughout the camp, they will probably select from among the number one central committee which will be recognized by the Mine Managers' Association as representative of the employes as a whole. In this way, union and non-union men alike share in a full measure of recognition as employees at the mines.

According to the annual statement just issued by the Hudson Bay Mines, the mine produced just a little over $3,000 net profit during the fiscal year, the poor showing being attributed to the high cost of labor and material, and a natural decline in ore. Ore reserves are estimated to contain upwards of 100,000 ounces of silver, and, despite the unfavorable year just past, the management is optimistic over the outlook and predicts the new fiscal year will be a prosperous one.

In Cobalt there is a general tendency to regard the present quotations for silver as not likely to be marked by any very material recession. This factor, taken in conjunction with the indication that high costs have passed the crest, leaves the producing mines in a strong position. Average costs at the various leading producers amounts to about 55 cents an ounce, thus leaving a margin of about 70 cents an ounce as net profit. Compared with this, a few days ago, costs averaged arount 25 cents an ounce and silver sold at an average of about 55 cents an ounce. Net profit of today, therefore amounts to more than twice as much per ounce of silver produced as was the case a few years ago. Offsetting this, of course, is the natural decline in production which has served to place the Camp as a whole on a profit earning basis about on a par with its banner days, when, although silver was cheap, yet gross production was at the peak, or more than double the present output.

Regarding the proposed plan, as outlined in last week's Journal, to construct light narrow gage railways to outlying mining camps such as Gowganda, nothing further of an official nature has been learned.

Silver Output for week exceeds half million dollars.

During the week ended November 14th, five Cobalt companies shipped a total of seven cars containing approximately 531,856 pounds of ore. The Buffalo was the heaviest shipper with two cars containing 198,000 pounds.

Following is a summary:—

Ore Shipments.

Shipper.	Cars.	Pounds.
Buffalo	2	198,000
Trethewey	2	125,969
La Rose	1	83,475
Mining Corp.	1	64,414
Coniagas	1	60,000
Total	7	531,858

Bullion Shipments.

During the corresponding period the Nipissing and the Mining Corporation made heavy shipments of bullion, the total amounting to 344,671 23 fine ounces. With silver having been quoted at between $1.25 and $1.28 an ounce during the week, it is evident that the weeks' shipments had a value of well over $400,000.

Following is a summary, in which it will be noted that the 60-bar shipment of the Nipissing was reported last Saturday:—

Shipper.	Bars.	Ounces.
Nipissing	60	80,811.51
Nipissing	148	200,517.48
Mining Corp.	64	63,342.24
Total	272	344,671.23

The value of the bullion, together with the estimated value of the ore shipped, brings the total value of the weeks shipments up to well over half a million dollars.

The Gold Mines.

Regardless of problems which still tend to worry the captains of industry, the gold mining industry of Northern Ontario continues to grow. Confidence in the future stability of prices, and a gradual decline in costs, and assured of longevity of the leading mines, freer rein to desired enlargment of operations appears to be one of the certainties of the future, not far distant.

The find at a depth of 1500 feet on the McIntyre-Porcupine is a confirmation of what had been learned by core-drilling. To all the leading mines it holds out added potentialities—assurance in fact. This company is now planning to continue the central shaft to a depth of 2000 feet. Continued development of ore to such a depth would unquestionably be followed by additions to the milling equipment. As the mine now stands, the physical condition and the milling facilities are adequate to make a net return of 20 per cent annually to shareholders. It is generally believed that the McIntyre will ask for a further extension of time on the option on the Plenaurum property.

The reported offer of $10 a share for control of the Hollinger Consolidated is stated to have never been made, according to an official of the company, who is quoted as having said: "Even were such an offer made, it would not be accepted." In connection with dividends on the Hollinger, it would not come as a surprise were the present policy to continue for some few months longer, no increase being made with the possible exception of two dividends in December, one in the form of a Christmas bonus. The Hollinger has indicated commercial ore to a depth of 1800 feet by diamond drilling, and in due time underground work will be carried to that point and beyond. Up to the present the great volume of ore has been taken from levels down as far as 800 feet. Below that point, work has been chiefly of an exploratory nature.

At the Dome Mines, according to official advice, an average of about 30,000 tons a month is being treated. No official statement has been made regarding costs, but it is learned in usually reliable circles that average costs are now a little under $4 a ton, being the lowest at any gold mine in the Dominion. Provided president J. S. Bache carries out his promise made some months ago, a dividend may be expected at the turn of the year, an announcement concerning which might be expected within the next month. As to the Dome Extension, a substantial tonnage will be treated in the Dome mill during the winter, the result of which will probably determine the course of the Dome in relation to the option it holds on Dome Extension and which holds good only until March.

Frank Hamilton, manager of the West Dome mine has made an examination of the Moneta property with a view to carrying on exploration work at or near the point where some "float" gold-bearing ore

was discovered by men who were digging a well. The Moneta, as well as the West Dome, is under the Pellatt Directorate.

Optimistic reports are in circulation in connection with the future plans of the Porcupine V. N. T., although official advice is decidedly difficult to obtain. In the Kirkland Lake district, a number of new operations are under way, in addition to the proven mines. Among the new ventures might be mentioned the Granby-Kirkland, Greene-Kirkland, Kirkland Combine, Marigold, etc. The latter is now in control of the property formerly known as the Lucky Cross. A number of short ore shoots have been found on the property, as indicated in a recent report.

The Wright-Hargreaves is not likely to acquire the control of the Sylvanite property, according to late official advice, despite many earlier rumors, that the Sylvanite would be absorbed by the former company. It is stated, that while differences appear to have cropped up in connection with the Tough-Oakes and the marging properties, yet the belief is still entertained that the Sylvanite may be ultimately included in the new consolidation.

The old mill on the Argonaut property (formerly the La Mine D'Or Huronia) in the Beaverhouse Lake section of the Larder Lake district is now in operation. It consists of stamps and straight amalgamation. It is being planned to add a ball-mill to the grinding equipment. In the meantime, the shaft has been continued from 80 feet to a depth of 200 feet at which point it is proposed to carry out lateral work. The ore contains considerable iron sulphides and is found difficult to treat with the present mill, the percentage of recovery not being as satisfactory as might be expected.

Another Ore Statement.

Following is a statement of ore shipments over the T. & N. O. Railway, for the month ending October 31st. (In tons of 2,000 lbs.)

SILVER ORE.

Cobalt Proper.	Tons.
Buffalo	573.45
Beaver	34.78
Coniagas	97.77
Dominion Reduction	32.50
Hudson Bay	30.69
La Rose	79.62
McKinley-Darragh	190.11
Mining Corporation	108.59
Nipissing	892.13
O'Brien	64.00
Penn Canadian	30.00
Peterson Lake	47.93
Thethewey	32.59
	2,214.16

The above shipments were made to the following Companies:—

CANADA.		
Deloro Smelting & Refining Co.	Marmora	650.47
Coniagas Reduction Co.	Thorold	97.77
UNITED STATES.		
American Smelting & Refining Co.	Pueblo	189.74
American Smelting & Refining Co.	Chrone	44.00
Pennsylvania Smelting Co.	Carnegie	220.11
ENGLAND.		
Henry Wiggin & Son	Birmingham	1,012.07
		2,214.16

NOTE.

Oct. 10th. Lowest price of silver during month	117,000
Oct. 30th. Highest price of silver during month	123,375
Average price of silver during month	119.192

THE SONS OF MARY.

The Sons of Martha have not to worry—of that their tetrarchs will take good care:
And they care not a whit for the Sons of Mary, what they must suffer or how they fare.
The Sons of Martha demand an increase (a favorite indoor game that they play):
They spout and they riot until they win it—and Mary's Sons are the lads that pay.

The Sons of Mary in all the ages have dared the venture and taken the chance;
They explore earth's riches and plan the bridges; invent the machinery, design the plants.
It is through them that on every work-day the Sons of Martha have work to do,
It is through them that on every pay-day the Sons of Martha get every sou.

They say to the railways, "Be ye fashioned." They say to the ships of the air, "Go, fly."
They train the youth and they heal the stricken; the tears of the mourner they help to dry.
They draft the maps and they paint the pictures; they carve the statue; the speech they speak—
While the Sons of Martha are seeking solely to do less labor for more per week.

The Sons of Mary their lives have given to fight the fever and purge the filth;
They graft the scion, they grow the blossom, they keep the fields of the world in tilth.
They write the book and they chant the poem, they make the music and dream the dream:
They to the Truth bear unselfish witness; they have the vision, they see the Gleam.

They do not preach that their only duties are spreading dissension and going on strike;
They do not teach that it's square and decent to scamp their work as they damn well like.
They aim to uphold a mind of fairness, not class suspicion and social strife.
They, too, must think of making a living—but they sometimes think of making a life.

And the Sons of Martha esteem this silly, convinced that Fortune will yield reward
To him that has the most brazen thorax, the lightest head and the strongest sword.
This, it seems, is the sum of their Credo—this is the way their reasoning runs:
"Let's force the birthright and seize the blessing, and lay the burden on Mary's Sons!"

—G.S.S. in New York Tribune.

Special Correspondence

BRITISH COLUMBIA.

Both the Britannia Mining & Smelting Co. and the Granby Consolidated Mining & Smelting Co. have subscribed half a million dollars to the second Victory Loan now being raised in Canada.

Alice Arm, B.C.

The Mineral Claims Development Company, Ltd., of Vancouver, is developing the Homestake Group, Alice Arm. The object of this company is to take up and develop prospects to the point where they can be offered to operating companies as proved mines. The Homestake Group consists of four claims of which George Clothier, Government mining engineer, says:

"Taking into consideration the width and continuity of the vein, the persistence of the mineral content, the improvement in appearance on what little depth has been gained in the open cuts, the grade of ore exposed in some of the cuts, and its favorable situation for mining, there are good reasons to believe that the property might easily develop an immense tonnage of concentrating ore."

Col. Gilson is the president of the Mineral Claims Development Company and C. M. Houghton is vice-president. The latter has been identified with the mining industry in British Columbia for the past twenty years, having been one of the pioneers of Rossland, B.C.

Stewart, B.C.

This mining centre may be said to be 'all set' for the winter. While many of its inhabitants have come south to spend the more severe months of the season there will be some 150 people remain in the town until the spring. A school has been opened and a good class of children has been mustered. In short, Stewart, not much more than a year ago deserted and without prospect of rehabilitation, is assuming the aspects of a permanent community and its residents have the utmost faith in its future.

Chief among the causes of its sudden development is the discovery of the riches of the Premier Mine, on which work is to be continued during the winter and from which several shipments of exceedingly high grade ore are expected before the spring. The Big Missouri, Joker, Forty-Nine and Bush also are promising groups of mineral claims, which are confidently expected to prove the mineral worth of the district of which Stewart is the Canadian outlet. While they are not yet proved mines, development in some instances is well advanced, and trial shipments probably will be shipped to the smelters this winter. In addition there are many prospects, the surface showings of which are most encouraging, the result being that prospectors and operators predict that Stewart is to be a mining town of first importance in the Canadian Northwest and that this will become more generally recognized during 1920.

On the Big Missouri the drilling has ceased, to be resumed on the return of better weather conditions. Work is to proceed without interruption in the driving of a cross tunnel on the E. Pluribus Claim, on which a high grade body of ore is being developed. The Province Group, it is expected, will be developed by diamond drill next season. Drilling on the Forty-Nine also is finished for the year but a considerable force of men will be maintained during the winter months. The Bush Mines, situated to the north of the Premier, are being extensively developed with encouraging results, ore of the first grade having been struck. On the New Alaska a tunnel is being driven to open up the ore body. The Nabob Group, on Glacier Creek, has been bonded by C. G. Shoning and associates of Lead Point, Wn. An assay of samples from this property secured by Mr. Skoning before the closing of the deal is said to have given returns of $189 in silver to the ton at current prices. Mr. Skoning, who has come south, proposes returning in the spring with the machinery necessary to open up this group.

A number of old properties are expected to become active next year. One of these is the Indian, on which some work was done in 1910, some first-class galena being taken from it at that time. There also is the Hercules for which a deal is said to be pending.

Anyox, B.C.

The Hidden Creek Mine, of the Granby Consolidated Mining and Smelting Company has increased its ore reserves as a result of the past year's development. The quartz property operated to supply silica to the smelter is carrying larger gold values than formerly.

The company's by-product coking plant at Anyox is undergoing repair. Fourteen ovens, however, are again in operation.

Sandon, B.C.

The most active mining camp of the Kootenay is Sandon, which is regaining its past reputation of being the premier silver-lead centre of the Province. It is estimated that there are four hundred men working in the mine and mills of the Sandon camp, including the Alamo concentrator. Five mines are producing ore for Clarence Cunningham, the largest individual operator of the district. Of these the ores of the Idaho, the Sovereign, the Wonderful and the Old Richmond-Eureka, are treated at the Alamo concentrator. Queen Bess, which made a fortune for Mr. Cunningham, is shipping its high-grade silver ore south of the line for treatment. The Rosebery-Surprise Mining Company, Limited, is operating three properties in this camp, the Surprise and the Ivanhoe, which are shipping to the company's concentrator at Rosebery, and the Canadian, which is under development. This is in addition to the Bosun of New Denver, which employs forty men and sends ore to Rosebery. One of the oldest and biggest mines of the country, the Noble Five, is terminating a five-year period of deep development by erecting a big concentrator only less than that of Alamo in size, in which the machinery now is being installed. This is expected to be working early in the year if not before. Mill feed for two years is in sight. Honorable James Dunsmuir, owner of the Noble Five, acquired the Reco, an adjoining property, during the summer, and it is being developed on its own line, but eventually will be joined in deep development with the larger mines. The Silversmith is now in what is probably the largest ore shoot at present exposed in the district. The high grade ore having a width of four feet. This great ore body is between the eighth and tenth levels. The Rambler-Cariboo, to which has been joined the Jenny and Last Chance claims, also has struck a new body of milling ore, and ore is being milled from the 1,000, 1,200 and 1,300-foot levels. The McAllister at Three Forks is another mine of much promise. It is operated by the Spokane Silver Mines Limited and since its re-opening last August development has been in progress without cessation. There are now blocked out five thousand tons of ore. Be-

sides there are many smaller mines and a large number of prospects upon which work is being done. In brief, the present condition of the Sandon camp is better than it has been for years. Zinc, which was formerly useless, and in fact it was considered a handicap to ore, is now in the form of concentrates, a more or less important product at every concentrator. It is unnecessary to speak of the high market value which is the chief contents of the ore of the district. For these reasons mining men are looking forward to a period of remarkable prosperity.

A new strike of clean galena is reported in No. 1 tunnel of the Granville property, Sandon. The Granville group is twenty years old and the tunnel in which this ore body was disclosed is one of the two old drifts which penetrate the mountain from opposite sides giving it about a hundred feet of extreme depth. On the main working level, which consists of a long cross-cut to the vein, a crew of men has drifted forty feet on a three-foot width of mill feed which carries on the foot wall three inches of galena carrying high values in silver and lead. There are three veins on the property and some eight hundred feet of work has been done.

Nelson, B.C.

Some excellent samples of ore have been taken from the Grant group, which is situated on Woodberry Creek. This property is in a dry ore belt and assays from similar specimens to those produced have run 1,545 ounces of silver, very light in lead and no zinc. The property is being developed by a drift that has been carried 150 feet. A shipment of thirty sacks to Trail Smelter last year brought $800.

It is the intention of the present owners to resume the development of the Athabasca Mine at Nelson. The mill will be put in operation. The Athabasca has been a large producer of gold during the past 20 years.

C. M. Moir, manager of the Spokane Mining Development Corporation, states that the Monarch Mine will be placed on a producing basis with as little loss of time as possible. Developed by open cuts, tunnels and shafts, two distinct ore bodies have been proven on the Monarch on different vein systems. The ore body developed last year produced three cars of ore from a 20-foot glory hole, the ore, which is self-fluxing, running 3½ per cent copper, and returning $15 to $18 a ton. There also is some value in precious metals. It is now intended to operate the property on the scale the known ore bodies warrant, and a compressor, air drills, serial tram, and electric power will be provided. Major MacDonald will be in charge. The carrying out of this programme of development should make the Monarch one of the most important properties from the standpoint of production in the district.

Quesnel, B.C.

R. W. Marsh has returned from Minneapolis, where he has been successful in financing a company organized to manufacture and operate his patent for the recovery of the gold and platinum values from the black sand. One of the leading dredging companies has investigated the patent and vouches for its practicability. Quesnel has been selected as the site for the first plant. Black sand will be purchased for treatment on the same basis as a smelter buys ore. The Process is an electro-chemical one and Mr. Marsh, the inventor, is one of the pioneers of the Cariboo.

John S. Horgan of the Lightning Creek Gold Gravel and Drainage Company will have charge of that company's mining operations henceforth. It is proposed to sink a gravel shaft to the bed rock in the original channel near the centre of the company's property.

Britannia, B.C.

The Britannia Mining & Smelting Company has been short of water for power owing to the dry season, the heavy frost preceding the snow fall preventing the replenishing of the supply by the the thawing of the underlying snow. Consequently the turbo-generating plant has had to be put in commission to supply power. In this plant steam is generated by oil fuel.

Victoria, B.C.

The recovery of potash from cement plants is the subject of a booklet compiled by Dr. A. W. G. Wilson and issued by the Canadian Department of Mines. It is stated that the potash content of the raw mix at the Tod Inlet Cement Works, Vancouver Island, is 0.50 per cent and at the Bamberton plant, also Vancouver Island, 0.53 per cent, while the cement carries 0.44 and 0.47 per cent respectively. The loss of potash at Tod Inlet through the lack of a potash recovery plant is over two tons a day, and at Bamberton, when operating, over one ton a day. Dr. Wilson points out that fifteen plants in the United States have installed potash recovery equipment.

Hon. John Hart, Minister of Finance, has announced that none of the British Columbia lands of the late Augustus Heinze, which were offered at tax sales held in 1918, have been redeemed. Consequently these holdings have reverted to the Crown. The property is situate chiefly in the Nelson, Rossland, Slocan and Kettle River assessment districts and totals approximately 701,543 acres. At last year's tax sale the sum of $55,000 was due in taxes. While some of this property was considered of value because of its mineral producing possibilities there was a quantity with much merchantable timber and a good proportion of agricultural land. Sections of the reverted lands form part of the grants made to the British-Southern and Columbia & Western Railways. Heinze acquired a half interest in these several years ago and since then no taxes have been paid.

The Ladysmith Smelting Corporation has taken a bond on a property situated on Thurlow Island belonging to the Green Lake Mining & Milling Company. The latter has been engaged in development during the summer.

Fort Steele, B.C.

The Victor Mine, Mouse Creek, is expected to be producing in the course of a few weeks. G. Gundry, who holds a lease, has obtained the necessary financial support and is purchasing the machinery required for a 50-ton concentrator, which it is hoped to have in operation before the winter is far advanced. The mine is a high grade silver proposition and there is said to be a considerable supply of rich mill feed available. It is planned to add to the capacity of the concentrator in the spring.

The Wild Horse Dredging Company, Wild Horse Creek, has suspended operations for the winter, the cold weather making it impossible to run the dredger to advantage. The company proposes operating vigorously next summer. This year delays were experienced in getting in machinery so that the actual season was short. These handicaps will not have to be faced next year.

Grand Forks, B.C.

J. E. Leonard, manager of the Chatterby Mining Company, which is operating the Lucille Dreyfus Mine, situated near the Great Northern Railway, two miles from Danville, Wn., has made the following interesting statement respecting the development of that property: "The ore body which has been yielding in the upper workings is to be sought by a cross cut, to be driven at an additional depth of 500 feet. The total depth to be attained will be 800 feet. We expect to complete the work in from 60 to 90 days. Operations will proceed with two shifts and with machine drills. A shipment of ore is to be made to the Trail Smelter immediately. The additional depth will be attained by use of a tunnel on the property of the Minnehaha Mining Company, on which the Lucille Dreyfus Company has a lease. This company also has obtained a lease on the compressor plant of the Minnehaha Company. Shipping ore in a body three to four feet wide is being followed by drift on the No. 3 tunnel level. This property has yielded considerable ore in the last three years." The company's officers are J. J. O'Connor, superintendent; A. D. Monnett, president, and Judge Chester F. Meller, secretary-treasurer. The head office is at Dayton, Wn.

Slocan, B.C.

A new discovery of dry silver ore is reported in the Bear River section by a party of prospectors returned from the hills for the winter and who propose to return as soon as the snow leaves to commence development. The property consists of three claims staked on Blue Mountain, which mark the location of a ledge, varying in width from one to three feet, and which has been traced for a distance of 600 feet. The samples show silver sulphide, native silver, and some gold. Assays run from 123 to 167 ounces of silver.

Trail, B.C.

Anticipating a program of development on an extensive scale the Consolidated Mining & Smelting Company is letting contracts for 765 feet of rails to be used on the new main level of the Sullivan Mine. Contracts also are to be awarded for 1,000 feet of tunnel and 500 feet of crosscutting. It is understood that the company, largely as a result of the present strike of the miners employed at the Sullivan Mine and the failure to date to reach an adjustment of the trouble, has decided to resort to the contract system of mining ore.

Ore receipts in gross tons for the week from October 22nd to 31st inclusive at the Trail smelter of the Consolidated Mining & Smelting Company totalled 4,897, the aggregate for the year to the date indicated being 275,597 tons. The largest contributors among the independent shippers were the Iron Mask, Kamloops, 845 tons; the Mandy, Le Pas, Manitoba, 406 tons; the North Star, Kimberley, 306 tons; the Quilp, Wn., 245 tons; the Standard, Silverton, 355 tons; and the Echo, Silverton, 104 tons. Of the company's properties the largest shipper was the Centre Star, Rossland, 1,422 tons. No lead or zinc ore was shipped from the Sullivan Mine, Kimberley, owing to the strike.

Kamloops, B.C.

The development of the Aspen Grove Mineral Claims, numbering 75 in all, is likely to be proceeded with before long. Joseph Errington, mining engineer, and a number of Eastern financiers, have taken a bond on this property. They propose doing considerable diamond drilling which would have been started before now but for the fact that Mr. Errington was detained in looking after interests at Brule Lake and at Cobalt.

Atlin, B.C.

There is a prospect that the immense deposits of hydro-magnesite in the Atlin district, British Columbia, will be developed. To place this property on a producing basis has been a problem before Nichol Thompson, of Vancouver, B.C., who with others is interested, for some years. Through correspondence he has interested British clients. Two difficulties have to be overcome. The first is that of transportation, the cost of which, because of the fact that the deposits are situated in the far northern interior, is somewhat high. The second is that of devising an effective as well as an economic method of calcining. Mr. Thompson recently was in receipt of advices from England that a process of successfully calcining fine powdered magnesite has been worked out so that at least one of the stated handicaps appears to have been overcome.

Dawson, Y.T.

About 120 new claims have been staked on Keno Hill and the extension of the new Mayo Silver district, and some 20 on Steep Creek, adjoining Lookout Mountain, since the middle of the summer. The Yukon Gold Company has an option on a group situated on Keno Hill where prospecting is in progress. The company also has staked water rights at Fraser Falls. Lookout Mountain, it is expected, will ship 500 tons or more silver and lead next spring. Moosehide, a well known creek north of Dawson, has been staked by John Lawrence and Chiefs Isaac and Silas, and 20 other Indians.

There seems to be a general tendency in the western provinces of Canada to adopt revolving tipples and shaking screens for the handling and screening of coal at collieries. This is in line with Cape Breton practice. There is no department of a colliery where so much unnecessary labor is possible as on the bankhead, and no department where careful layout of the bankhead tracks and screens for automatic handling, will effect so permanent a saving, both in labor and in coal breakage.

OBITUARY.

The death is announced of Mr. E. L. Gilpin of Sydney, N. S., following pneumonia, at an early age of forty-three years.

Mr. Gilpin was Property Agent of the Dominion Iron and Steel Company, and Secretary of the Employees Mutual Benefit Society. Joining the Steel Company's staff twenty years ago, before the plant was built, he had been in the Company's service for as long a time, if not longer, than any other official or employee. As Property Agent of the Company, he was brought much into touch with the municipal and civic officials of Sydney and district, and took much interest in the civic development of the City. As Secretary of the Benefit Society he was known to all the employees of the Company, and in other directions his activities were varied and extended.

Mr. Gilpin belonged to a family with a long and honorable record in Nova Scotia, his father, Dr. Edwin Gilpin, having been Commissioner of Mines for many years. His grandfather was Dean of the Cathedral of Halifax.

Manitoba Notes

Rice Lake Operators to Form Association.

In order to keep a vigilant eye upon the doings in the Rice Lake field, and also to ascertain its requirements, and if possible supply them, it is proposed to organize a strong association of mining operators, which will include all those now operating and who have received certificates from the public utilities commissioner.

The call has been sent out by Gordon C. McTavish, and the following is a copy:—

"Gentlemen:—A suggestion has been made that the time has arrived for the making of a concerted effort on the part of those having interests in the Rice Lake district, with a view to securing from the Dominion and provincial governments certain absolutely essential improvements.

"Certain interests are already working to this end, but it is felt that representations made by those who are now actively engaged or about to engage in actual mining operations will carry most weight with the proper authorities.

"The suggestion is that there should be formed a small association of mining operators including those now operating and those raising funds for the purpose of operating, and that the members should consist of two officials of each of the companies or syndicates involved. A copy of this letter is being sent to all of the companies operating in the Rice Lake district, which have received certificates from the public utilities commissioner, and in addition, to the Brooklyn Mining Company, Limited, which has not yet put its stock upon the local market, and to the Angus McDonald syndicate, which has raised its development funds by private subscription.

"It is proposed to hold a preliminary meeting in the lecture hall of the Board of Trade building on Friday, November 21, at 4 p.m., and you are urgently requested to be represented at such meeting by two of your officials.

"If you are interested in this project, a line from you to that effect and statement that you will be represented at the meeting above mentioned, will be very much appreciated.

"If any of the eligible companies, syndicates or private owners are omitted, it is hoped that intimation of that fact will be made to the writer before the date fixed for the meeting.

"Yours truly,
"G. C. McTAVISH,
Secretary Gold Pan Mines, Ltd."

THE GET-RICH QUICK BRIGADE.

The following excerpts from an article by "C.A.B." in the mining columns of the Manitoba Free Press have a wider application than the environs of Winnipeg.

"But of all the sickening depravity which the greed for gold is responsible for, perhaps the most repulsive is the subordination of persons who hold positions of trust, and whose conduct previously had not been above suspicion. The favorite game of the baser seller of stocks is to ferret out some journalist who can get their puffs into his paper under the guise of news. They do not as a rule pay him anything in cash—that would be too crude; besides these gentry usually have a very distinct reluctance to parting with real money, but they allow this "press agent" to "underwrite a block of stock" at a low price. It is evidently then his duty to his wallet to boost this stock to such a point that he can sell (something he never paid for) at a profit. To the eternal credit of an underpaid class, it can be said newspaper men who lend themselves to such infamous deceits are few and far between, yet it is most unfortunately true that they exist, and apparently, for a time at any rate, flourish like young bay trees.

And the weak-kneed amongst the news-gatherers are not the only victims of the high priests of the Get-rich-quick cult. There is the man of budding scientific reputation, who standing, perhaps, on the threshold of what might have been a noble career, in a weak moment yields to the temptation of a big cheque and lends his name to reports, that while they help the sale of stock to the ignorant yet effectually debar the signer from the confidence and respect of men whose trust had been worth many gold mines to him, later on. The men at the head of a mining engineering profession are always above suspicion, otherwise they would not receive such princely pay. For instance, John Hays Hammond is known to have been paid $250,000 a year and expenses, for a long period."

It may be said in defence of the journalist that his sins arise more often from lack of accurate knowledge than from deliberate depravity, and truth to tell the wiles of the stock promoter would deceive the very elect.

The Canadian journalist has moreover such an innate fear of "knocking" his district that he unconsciously helps the stock promoter.

Recently, an eminent mining geologist visited Winnipeg, and that part of his address given before the mining men of Winnipeg which referred to the similarity of Northern Manitoba to pre-Cambrian districts in other portions of Canada which had been proved to yield precious metals was given much prominence. The other part of the address, which concerned prospecting and wise investment, was not reported. Was it because the speaker said that no prospect in Canada had ever been developed into a mine by the sale of ten cent stock, and that an investor should set aside a tenth of the money that he intended to invest in a mine for the purpose of getting proper professional advice?

There is a certain town in the West, which defaulted on its bonds, and at one time in its history, the person who had doubts as to the financial sanity of the way things were progressing was intimidated by large bill-posters warning "knockers" to have a care, and dare not open his mouth, no matter how wise his counsel.

Canada is large enough, and rich enough not to fear "knockers," but it has many and grave reasons to fear the giddy, irresponsible and clamant booster.

CANADA'S PER CAPITA WEALTH.

Ottawa.—National wealth of Canada was $19,002,000,000 in 1917, ranking the Dominion sixth among all countries. This shows per capita wealth of $2,375, the highest of any country on the figures used, and most likely the highest on any current estimates of world wealth now available.

Nova Scotia Notes

The Bonar Head Colliery of the Dominion Coal Co.

The Dominion Coal Company announces that its engineers are surveying the route for the branch line from the Canadian National Railway to Bonar Head which is projected to give access to the site of the proposed new undersea colliery at that place. The completion of this railway is a necessary preliminary to the commencement of any heavy construction work or shaft sinking. As the Winter has now set in, the construction of the new branch railway is not likely to be undertaken until the Spring.

It is understood that the plans of the Dominion Coal Company's engineers contemplate the sinking of a shaft to the Sydney Main Seam, presumably as near to the coastline as seems advisable, and then driving out seawards to intersect the undersea continuation of the Main Seam by two cross-measure, or "stone" tunnels having a slight inclination in favour of the load. If the Dominion Company contemplates the extraction of coal to the maximum seaward extension of its leased areas, it will be necessary that the size of the shaft and tunnel openings shall be unusually capacious, and the construction work of very permanent and therefore quite costly character. The thickness and quality of the coal seams in the vicinity of the proposed new opening are not definitely known, and the character of the seams in the undersea area are necessarily a matter of conjecture, as no opening has yet been made upon this virgin territory.

The extent to which the Dominion Company will develop the undersea leases in the vicinity of Bonar Head will naturally depend upon the thickness and quality of the Sydney Main Seam and the other seams overlying and underlying it, so that it seems unlikely that the full programme of development announced in the newspapers will be undertaken until more is known of the physical characteristics of the coal in the undersea area. As the coal leases to the coastal barrier are held by the Nova Scotia Steel and Coal Co., the site of the new colliery will overlie the leased coal of the Scotia Company, and the permission of the Scotia Company will be required before the work of sinking the shaft and driving the tunnels is undertaken. This, however, is purely a formal matter, the procedure for which is prescribed by the Mines Act, and it is not to be expected that any difficulty will arise in this particular.

In view, therefore, of the necessity to build the branch railway, of the advisability of thoroly testing the character of the coal seams in the Bonar Point area before committing itself to a very large capital expenditure, it seems probable that much preliminary work will require to be done before any appreciable output of coal is secured from the undersea leases in this neighbourhood. The officials of the Dominion Company state that at least twelve months will elapse before coal is shipped from the projected colliery.

The Dominion Coal Company has requested permission from the Department of Immigration, which it is understood has been given, to bring in a number of miners from Belgium, France and Italy, to replace the men who went home to fight in 1914. In August and September of that year, some 800 miners answered the mobilization call and returned to Europe, including a number of British reservists. While the number of men on the Coal Company's payroll is of course much less than it was at the time of maximum outputs in the early portion of the war period, the deficiency is almost altogether in the men employed in producing coal at the face, a condition that more than anything else tends to high costs of production and restricted outputs.

Dominion Coal Outputs.

The production of the collieries of the Dominion Coal Company during September and October was as under:

Colliery.	September.	October.
1	21,733	29,378
2	47,679	53,388
4	26.234	28,462
5	5,984	7,050
6	18,284	19,420
9	21,909	25,202
10	9,005	11,587
11	14,139	14,869
12	15,674	16,265
14	14,872	18,510
15	10,328	12,892
16	12,609	14,834
21	11,670	13,247
22	12,508	15,411
	242,628	280,615
Springhill No. 2	33,599	34,410
Springhill No. 6	1,232	1,491
	34,831	35,901
Total	277,459	316,516

The Managers of the Dominion Collieries.

As a large number of changes have recently taken place in the positions of manager at the Cape Breton collieries of the Dominion Coal Company, the following list of the managers of the individual collieries, as the present time, may be of interest.

1.....John Monroe. A. D. Matheson, Ass.
2.....P. T. Prendergast.
4.....John Casey.
5.....W. G. Ross.
6.....W. T. Chew.
9.....D. J. McCuish.
10.....Thomas McDonald.
11.....N. A. McDonald.
12.....A. R. McDonald.
14.....H. A. MacLeod.
15.....W. D. Haley.
16.....James Connors.
17.....John P. McIntyre.
21.....John McIntosh.
22.....Robert Simpson.
24.....James Moseley.

Nova Scotia Steel and Coal Company's Production.

The output of the Scotia collieries during September and October 1919, and the corresponding production in 1918, is as under:—

	1919		1918	
	September	October	September	October
Princess	14,485	15,320	10,520	10,601
Florence	20,239	21,913	11,962	14,327
Scotia	7,926	8,184	7,287	7,002
Jubilee	9,708	11,090	10,182	11,516
	52,358	56,507	39,941	43,446

The Government has placed an embargo on the export of coal from Canadian mines, in consequence of the serious situation occasioned by the strike of the bituminous coal-workers in the United States. This is a natural action, but it does not necessarily mean that water exports will be stopped, because transportation difficulties will prevent the full relief of Canadian coal production being applied to Canadian needs. The situation throws into high relief what the founders of the Dominion Coal Company always fully realized, namely that the development of Canadian mines is chiefly a matter of seasonal transportation. The coal mines of Nova Scotia are always forgotten and despised until outside sources of supply are interfered with, and then, this neglected province becomes a centre of great solicitude. There are people in Toronto who confuse Nova Scotia with Nova Zembla.

WANT CHANGES MADE IN MINING ACT.

Meeting in Toronto will discuss proposition submitted by Port Arthur Board of Trade—Nipissing Extension's program of development —Progress made at the Keora mine In Porcupine.

(From Our Toronto Correspondent.)

At the annual meeting of the Associated Boards of Trade and Chambers of Commerce to be held in Toronto Nov. 20 and 21, there will be discussed a resolution adopted by the Port Arthur Board of Trade which has a good deal of bearing on the Mines Act of Ontario. The resolution provides, amongst other things, that the recorder of a mining division have the power to issue special renewal license; that patents be issued for claims or parts of claims covered by water, where it can be shown that the granting of such patent will not interfere with navigation; that patents instead of leases be granted for mining locations in Crown forest reserves and timber berths where prospecting is permitted; that the assessment work consist of $100 worth of actual mining work per 40-acre location per year, for a period of three years, when a patent shall be issued at the usual price per acre; that the assessment work may include cost of survey, not to exceed $100 per location, and in the case of an iron location may include the cost of a magnetic survey; that in the case of claims taken up for iron and iron pyrites the assessment work may be applied on one or more of ten continuous claims and that the unorganized portion of the Fort Frances mining division be administered by the mining recorder of Port Arthur.

Starting their development work last February, the Porcupine Keora Mining Company, Limited, composed of Toronto and Philadelphia interests, has already spent $70,000 in buildings, shaft-sinking and diamond drilling on their property in the Township of Whitney, Porcupine district. The work was carried on in order to test the northern ore body. To develop the low grade ore bodies will require an expensive plant and the company is not in a position to instal it, so they are starting with the high grade ore and from the treatment and sale of it will raise enough money for the company's own mill. An extensive drilling campaign has just been completed and according to the statement of the mine manager Nos. 1 and 2 diamond drill holes are down to 905 feet and 997 feet and Nos. 4, 5 and 6 were put down to 350 feet, while No. 7 is down to 1,000 feet, with the result that No. 1 vein, which was the objective in deep diamond drilling, has been proven to contain the same values at the depth as are shown on the surface. In putting down No. 2 hole 76 feet below the surface, a new ore body was encountered which is now known as No. 5, and shows average width of 9 feet and an average value of $17.44. This discovery caused the company to put down Nos. 4, 5, 6 and 7 holes over a total length of 700 feet and the results show an average grade of ore of $20 to the ton, except in No. 4 hole, where the highest assay obtained was around $12.00. The results of this diamond drilling encouraged the company to commence sinking a shaft to open up Nos. 5 and 6 at the point cut by the No. 5 hole, where vein No. 5 is shown to be 20 feet wide and averages $110 per ton. No. 6 vein, 100 feet to the north, which will be opened up in the same work, shows 10 feet of $47.56 per ton. The money is in the treasury to cover the cost of bringing the mine to a producing stage and it is expected that in five months' time the minimum production of 25 tons daily will be coming from No. 5 vein, netting the company between thirty and forty thousand monthly, according to the statement of the mine manager.

The Northern Securities, Limited, are in receipt of encouraging reports regarding the development program in prospect for the Nipissing Extension Mines, Limited, whose property of forty acres is situated in the Peterson Lake area of the Township of Coleman. According to the report Major E. H. Birkett, the resident mine manager of the mine is now in Cobalt in complete charge of the property and has commenced a careful campaign for development. His reports concerning the property and its possibilities are very favorable and he further reports that he has recently discovered a new vein on the Nipissing Extension which had never before been located. This discovery, he says, has been stripped for sixty feet and it averages one inch wide of smaltite and cobalt bloom. The wall rock carries leaf silver. The report states that the vein has been assayed and proved to carry 830 ounces of silver to the ton, while the wall rock carries 115 ounces of silver to the ton. The company bases its faith in the property on the richness of the veins as found by Consulting Engineer Strong.

Davidson Consolidated is announced to have extensive plans for the future. A townsite is to be laid out, a church and schoolhouse built, as well as a number of additional cottages for the accommodation of married employees. Timber is now being cut for these at the company's sawmill. A large addition is to be made to the mill building to accommodate additional equipment to bring capacity to 500 tons a day.

It may be laid down as an axiom that no modern nation can retain economic independence unless it possesses within its frontiers a sufficient supply of bituminous coal.

Coal is the motive power of civilization.

As this war and its preliminaries have abundantly demonstrated economic independence sooner or later spells political subservience.

The national future of Canada, its maintenance of national integrity and its political independence is bound up with the coalfields of Cape Breton Island.

Extent of territory, density of population, and agricultural wealth are only a menace if coal is absent.

In these times coal spells power, it is a necessity of nationhood.

—Extracts from a paper by the Editor, read before Mining Society of Nova Scotia, April, 1917.

AN UNUSUALLY PLACED METALLURGICAL LABORATORY.

Our metallurgical readers will be interested in the following account from the "Westporter Herald" of the Dorr Company's new laboratory and consulting offices near Westport, Conn., which Mr. Dorr has combined with a bird and small game sanctuary. This is a novel and praiseworthy example of the ruralization of industry.

About two miles from Westport, at the confluence of the Saugatuck and Aspetuck rivers in a picturesque stretch of woodland is an old mill which has been a landmark since the early days of the town. Built in pre-Revolutionary times when water power was a necessary part of business equipment, the mill was used for spinning, its operative force being brought from England. Owing to changes wrought by time and circumstances, it was transformed about seventy years ago into a grist mill and was known for miles around as Kelly's Mill to all the farmer folk who journeyed thither with their bags of grain from the season's harvest. Continuing to operate as a grist mill, it again changed ownership when considerable improvement in equipment was made and it became known as Sipperley's Mill. Two years ago the property was purchased by the Dorr Company, a large engineering and metallurgical research firm with offices in New York, Denver and London, England. The scope of the work at Westport includes analyses; extended research along various lines, and the investigation, development, testing and improvement of industrial, chemical and metallurgical processes. The mill has been entirely remodelled and refitted with an attractive library and conference room, sleeping accommodations for transient business visitors, a completely equipped analytical laboratory, and a testing plant of commercial scale tests along many lines. Surrounding the mill both up and down the two rivers is a tract of land consisting of forty-six acres, some in meadows and hillside, some in pond and waterways and the rest in natural woodland. Along the streams and in the meadows all kinds of birds native to New England are to be found in large numbers, likewise much small game. The rare wood ducks are here and the shy Heron, with thrushes and wood robins and all the little feathered songsters which seek the quiet of the undisturbed forest.

Last spring, through the untiring efforts of Mr. Herbert Fox and the generosity of Mr. Dorr, and their co-operation with the Nature Club of Westport, the services of Mr. Wilbur F. Smith, state game warden, were secured and through him the property was leased by the state for a Bird and Game Reserve and is now protected by state law from all hunting, either shooting or trapping, and is under the jurisdiction of Mr. Smith and the care of the Nature Club. Mr. Dorr has asked the Nature Club to establish feeding places and to put up bird houses. These have all been occupied this past summer, demonstrating clearly that the birds readily accept the offerings of their human friends.

The Junior Audubon Club of Westport, which numbers about four hundred members, will be glad to know that there is a bird reservation so near and the Nature Club hopes they will keep up their interest in observing and protecting the birds. A plan is being made for them all sometime to visit with their teachers this lovely natural bird retreat where may be seen so many birds which are too shy to venture away from the quiet wood, and also the five deer which have joined the wild colony at the Old Mill.

The townspeople, too, are asked to take an interest in this movement to protect the birds and game which so many times are thoughtlessly and ruthlessly destroyed and to assist the Nature Club by donations of suet, seed, nuts and grain for feeding during the cold winter months. Information regarding feeding and the making and placing of bird boxes may be obtained at the Public Library and any suggestions or advice from personal observation and experience will be gratefully received by the Nature Club, which looks for the hearty co-operation of all friends of birds and game to perpetuate this Preserve and show the appreciation which should be extended to Mr. Dorr for making it possible to have so beautiful a spot as this for a Bird and Game Reservation in our own town.

"BORE FOR POWER!" SAYS SIR CHAS. PARSONS.

In an address recently delivered in London, Eng., Hon. Sir Chas. A. Parsons, inventor of the Parsons turbine, said that "failing new and unexpected discoveries in science, such as the harnessing of the latent molecular and atomic energy in matter, the great position of England cannot be maintained for an indefinite period. At some time or other, more or less remote, the population will gradually migrate to those countries where the natural sources of energy are the most abundant."

England is using up its coal more rapidly than most other countries, and Sir Charles states that long before it reaches the point of exhaustion, it may pay England to import coal from countries where it is workable at lower cost. Ultimately water-power will be more rapidly developed, although the cost of harnessing all the water-power of the world would be about £8,000,000,000.

What shall England do to be saved from the disaster threatened by the exhaustion of its coal and the competition of other lands with plenty of cheap power? Sir Chas. Parsons' advice may be summed up in the one word: "Bore." There may be cheap power waiting, ready to be tapped, down deep in the crust of the earth, he says.

He recalled that some years ago he suggested boring a shaft 12 miles deep, or about 10 times deeper than any in existence. At that time the cost was estimated at £5,000,000, and the time that would be required at 85 years! Since then, he added, experiments have been made, showing that in limestone a depth of 15 miles is probably practicable, and in granite a depth of 30 miles might be reached.

"Little is at present known of the earth's interior," said Sir Charles. "When we consider that the estimated cost of sinking a shaft to a depth of 12 miles at present-day prices is not much more than the cost of one day of the war to Great Britain alone, the expense seems trivial compared with the possible knowledge that might be gained by an investigation into this unexplored region of the earth."

In Italy, at Lardarello, he said, bore holes have been sunk which discharge large volumes of high-pressure steam, which is used to generate about 10,000 h.p. by turbines. A similar project is on foot near Naples to supply power to the great works in that district.

Without promising that a 12-mile bore hole in England would yield ready-made steam-power, Sir Chas. Parsons urged that "the whole subject merits the most careful consideration."

THE PROSPECTS OF RAILROAD ELECTRIFICATION IN AMERICA AND ABROAD.

By F. H. SHEPARD*

The world-wide shortage of coal during the great war has emphasized more clearly than ever the necessity of fuel economy in industry, while the present shortage of labor and the certainty of its continuing scarcity throughout the construction period forms another most serious problem. But fortunately we have at our disposal a means that will greatly assist in alleviating both of these conditions; namely—electrification.

The use of electricity in industry saves both fuel and labor. This fact is recognized throughout the world today and in order to secure these advantages, practically all of the nations are now considering plans for the electric generation of power. In England, Belgium and France, among others, these plans are being prepared by official commissions, so that a tremendous activity in electrical power development may be expected with the stabilization following the advent of peace. In all cases, the ideal in view is a broad one: To use electricity for all possible power purposes, including railroad operation.

The operation of the railroads will naturally form an important part of any program of general electrification, for in almost every country the railroads form one of the largest users of fuel and labor. Nor are the advantages obtained from railroad electrification limited solely to economy in fuel consumption and the more effective use of labor. Among others, the following can be mentioned:

1. Greater speed of movement for the heaviest trains, due to the fact that electric locomotives can be made much more powerful than the largest steam locomotives.

2. Greater nicety of control.

3. Increased traffic capacity of existing tracks, terminals, grades, tunnels, and other points of traffic restriction, because when electricity is used, heavier trains can be operated at higher speeds and less time is consumed at terminals and in yards.

4. Operation where the use of steam is impossible or objectionable, as in long tunnels.

5. Independence of weather conditions, since the electric locomotive is not effected by cold weather.

6. More reliable operation, as proved by the statistics of all existing electrifications.

7. More effective use of all rolling stock, due to more expeditious movement of traffic.

8. These are some of the advantages that are now being obtained for the mere substitution of the electric locomotive for the steam locomotive, but they by no means tell the whole story.

Consider electric illumination. When first introduced, the electric lamp supplanted a gas or an oil light because of certain advantages it possessed, and at first it occurred to no one that it would ever do much more. But the electric lamp has within thirty years revolutionized illumination and has given us our light-flooded factories, with their greatly increased production and safety, and our Great White Ways as well.

A further example is the growth of our great city and interurban electric transportation service of today from the substitution of the electric motor for the horse on street cars.

There is good reason to expect that the electric operation of the railroads is capable of a similar development and will in time revolutionize our present transportation methods and provide us with services we know little or nothing about today.

Since the United States has an abundance of coal, railroad electrification here has been determined solely by local conditions. Passenger terminal problems caused the electrification of the New York Central at New York and the Pennsylvania at New York and Philadelphia. The limitations of the steam locomotive determined the electrification of the Baltimore tunnel on the Baltimore & Ohio, the Cascade tunnel on the Great Northern, the St. Clair tunnel on the Grand Trunk, the Hoosac tunnel on the Boston & Maine and the Detroit River tunnel on the Michigan Central. Examples of electrified railroads with freight as well as passanger service are the Norfolk & Western, the Chicago Milwaukee & St. Paul and the New York, New Haven & Hartford.

While the other electrifications are successful and interesting, the last three are more properly representative of general railroad electrification. The Norfolk & Western is an example of electrification under the heaviest conditions of freight traffic on a mountain grade. The Chicago Milwaukee & St. Paul has in operation the longest continuous mileage in the world, and when completed will cross five mountain ranges. The New York, New Haven & Hartford has a very large movement of both freight and passenger traffic. All three installations are successful and profitable and, when financial conditions are stablilized and the American railroad question settled, it is expected that all three will extend their electrified service.

In addition there are sections of railroads about the country where the present congestion of traffic or the availability of water-power warrants the early adoption of electric power. These possibilities alone promise under normal conditions of finance (as no engineering problems now remain to be solved) extensive activity in the electrification of railroads for many years to come.

Different from America, European and South American countries, with the exception of England alone, lack an adequate supply of fuel, but many of them including Norway, Sweden, Switzerland, Italy, Spain and Brazil, have large amounts of water power, while France has a moderate amount. These resources combined with the high cost of fuel make extensive railroad electrification in these countries inevitable sooner or later.

The neutral countries will probably be the first to undertake this work, Switzerland having a program covering a term of years well established, while both Norway and Sweden are giving active consideration to definite projects. In England, a considerable amount of electrification is in contemplation along with the general plan for the electrification of industry. A French Commission, composed of Government and railroad engineers, have already visited the United States in order to thoroughly familiarize themselves with American practice. The Italian Government will continue their definite program as soon as financial conditions permit. An official Belgian Commission is already planning to rehabilitate with electric power at least a portion of the railroads destroyed by the

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* Director of Heavy Traction, Westinghouse Electric & Mfg. Co.

Germans. In Spain, Brazil and South Africa as well railroad electrification is under active consideration.

It is evident, therefore, that the next decade will see a large amount of railroad electrification in almost every quarter of the world.

MEETING OF TORONTO BRANCH OF CANADIAN MINING INSTITUTE.

New Provincial Minister of Mines Addresses Institute Members.

Reports from Toronto of the meeting and dinner of the Toronto Branch of the Canadian Mining Institute on Saturday, at which Minister of Mines Mills and Attorney-General Ramsey were the specially invited guests, were reassuring to representatives of the mineral industries of Ontario. The new ministers, while not obligating themselves to do other than deal fairly with all classes and industries, proclaimed their purpose to promote economics and encourage capital.

Mutual felicitations and pledges of co-operations were exchanged. President Tyrrell voicing the sentiments of the mining fraternity, and Minister Mills frankly admitting his earnest desire to have Ontario in general and the Fort William district in particular retain the premier position. In so doing the Minister of Mines reviewed the out putting statistics of the current year and manifested a knowledge of the situation that evoked applause. He argued for increased production while humorously declaring that "it is a long way from the 'cab' to the cabinet," he being a locomotive engineer.

Professor Miller was most optimistic as to the future of North Country and ventured the projection that "there are more Cobalts and more Porcupines." He also directed attention to the fact that the nickel industry despite its adversities in the earlier years of its development, is the greatest of its kind and merited pride as such.

Messrs. Tyrrell and Haultain complimented the Ministers upon their plain-speaking. Among the business transacted was the election of Mr. Clifford E. Smith to the presidency of the Toronto branch, and the decision to invite the Canadian Mining Institute to hold its next annual meeting in Toronto.

"A SCHOOL REUNION."

Toike-Oike.

A reunion of the graduates of the School of Science and of the Faculty of Applied Science and Engineering is to be held in Toronto on the 12th and 13th of December. This reunion has aroused a great deal of interest among the alumni all over Ontario and at more distant points, and advanced indications are that almost all good school men will be on hand. A live program is being prepared to cover the Friday evening and all of the Saturday. Special railway rates are being secured from all points in Canada.

It is considered desirable to gather the alumni of the old school together at this time to renew the friendship and acquaintances of "Varsity" days upon which time the war has made great inroads. It is essential that any university or college that desires to stand in the front ranks of educational institutions should have a strong, active alumni, and this reunion is planned with a view to consolidating the existing wealth of school spirit into an organization of that kind.

The alumni will be pleased to welcome the new dean, and to hear from him his hopes and his ideas for the future conduct of the school.

The move for a reunion has been most enthusiastically received wherever broached and the committee is endeavoring to get in touch with all graduates, but as the present list of addresses is very incomplete, they are unable to reach all of the graduates and will be pleased to send full details of the program to any alumnus on request to Mr. Joseph Bannigan, 7 King St., East, Toronto, Ontario.

NICKEL COINAGE ADVOCATED IN CANADA.

It must always remain a puzzle why Canada, the world's main producer of nickel, yet neglects to utilize the metal for coinage. If only for sentimental purposes, the official use in this way of such a typically Canadian metal as nickel would be most appropriate. But quite apart from that, it would be good business, for by the introduction of nickel 5-cent pieces, and for that matter also 10-cent pieces, in place of the present silver coins, the national treasury would effect a very considerable saving, certainly amounting to two or three hundred thousand dollars annually at the present high price of silver. Then again there are a variety of purposes, such as for cooking utensils, for which nickel and its alloys, notably Monel metal, are eminently suitable, not merely as a substitute for other metals, but owing to superior wearing qualities, cleanliness, and generally more "finished" appearance. These features would go far to outweight the somewhat higher initial cost, and owing to its longer life the nickel article would probably be found to be little or no more expensive in the long run. We need an active campaign to popularise the use of nickel and its alloys, and this is especially true now that the refining of nickel has taken its place as a firmly established home industry.—Canadian Mining Institute Bulletin.

A SILVER PROPHECY.

In view of the record figure to which the price of silver has recently risen it is of interest to recall that an era of permanently dearer silver was predicted in a work on "Peace Problems in Economics and Finance," of which a second edition was published in February, 1918. In his preface to that edition the author, Mr. Uriel d'Acosta, declared that "the era of cheap silver, which has lasted about thirty years, has come to an end," and that "a permanently higher value for the metal has been established." The change in the value of the white metal, he contended, was the consequence of the impoverishment of the West and the greater prosperity of the East. Gresham's law, he added, applies itself to the whole of Western civilisation in driving silver to the East as a result of inflated paper currencies. In view of the European demand for silver for currency purposes and for the industrial arts it was hardly likely, in Mr. D'Acosta's opinion, that the value of silver will for many years to come be much less than it was in 1913. These prophecies, we think, form a rather striking example of what Lord Curzon once described as intelligent anticipation of events before they occur.

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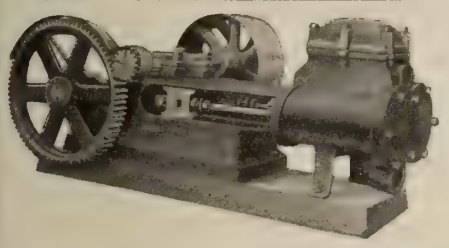

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The Liverpool Post's gossip writer surmises that one reason for the optimism of the British Chancellor of the Exchequer is a vast discovery of gold in the Yukon territory. A solution to this mystery might be found in the politics of the aforesaid "Post." Englishmen have a sense of humor which it is asserted the peoples of other countries cannot understand.

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1	60″ x 14′	70	JOHN INGLIS	85 lbs.
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3	72″ x 18′	150		140 lbs.
2	72″ x 18′	150	BROWNELL	150 lbs.
2	72″ x 18′	150		150 lbs.
2	72″ x 18′	150	STEWART	140 lbs.
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1	48″ x 17′	55	E. LEONARD & SON	100 lbs.
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All communications should be addressed to the Secretary, War Purchasing Commission, Booth Building, Ottawa, who will be glad to supply lists and further details to those interested.

EDITORIAL

Are the Programmes of Technical Society Meetings too Crowded ?

A characteristic of recent meetings of technical societies, notably the September meeting of the American Institute of Mining & Metallurgical Engineers in Chicago, has been the bewilderingly large number of papers presented, the wide range of subjects dealt with in these papers, and the very specialised character of some of the subjects dealt with.

The state of mind of the man who conscientiously should try to compass the whole programme—or even that part of the programme in which he is specially interested—varies between amusement and despair, according to his temperament.

If one is of a social nature—conviviality being now an archaic term—he frankly abandons the attempt to attend the reading of papers and the discussions arising out of them, and betakes himself to the lighter diversions provided, promising that when he gets home he will read the papers—which he never does.

When, as now seems to be the prevailing mode, societies with associated interests have sideshows of their own, coinciding in time, but not in place with those of the major meetings, then one begins to see some advantages in what our theosophical friends term functioning on the astral plane .

Has not the multiplication of sections, the variety of subjects dealt with in the papers, and the number of coincident attractions rather exceeded the useful and practical limit at metropolitan meetings of technical societies in Canada and in the United States?

It will be conceded that the discussion on a paper, and not the actual reading of a paper itself, is the more profitable proceeding, except on those rare and outstanding occasions when some epoch-making improvement of practice is announced by the man who perfected the improvement, possibly as the crowning point of years of hard work.

A commendable innovation at the Chicago meeting referred to was the use of the symposium, which consisted in the combined discussion of a number of papers relating to phases of one general subject. A fine example of this method was the symposium on sulphur in coal. In this case, a number of papers, many of them previously printed in the Bulletin, were reviewed in a general discussion—a worth-while discussion.

As a further improvement on the symposium method it may be suggested that at the average metropolitan meeting a judicious selection of four or at the outside six important papers would provoke really worth-while discussion, always provided that such papers had been previously printed in the Bulletin, and that the persons attending came prepared to discuss the subject selected after due deliberation and preparation. Written discussion would also be invited from those unable to be present.

The logical result of the method suggested would be that presentation of new papers at metropolitan meetings would not be asked, but that a signal honor would be conferred on the authors of a few papers, previously read at branch and local meetings, selected because of their merit, and because of their bearing on present and pressing problems.

In this way, concentration of thought and energy would be achieved, in place of the existing dissipation of mental effort, which leads either to negation or to superficiality.

From the point of view of a society secretary there is some objection to the change suggested, inasmuch as the metropolitan meetings are largely relied upon to provide the matter for annual transactions of respectable dimensions, but the question may be asked, should not the proceedings of the branches and technical sections provide a sufficient mass of material from which to cull a collection of annual transactions meriting publication?

There is, of course, another viewpoint, for which there is much to be said, which is the frank admission that the annual metropolitan gatherings of technical societies are really social functions, which would compel the conclusion that the solid work of reading and discussing papers should be done throughout the year in the branch meetings. If this admission is made, it discovers an added reason why the papers at the larger gatherings should be reduced to a few previously published, selected for discussion, rather than for initial presentation. There is also the consideration that authors of papers representing possibly months of work and years of observation will not be disappointed at the meagre audience and distracted attention which so often is the lot of persons who present their papers in person; especially as the qualifications which fit a man to prepare a technical contribution of merit do not necessarily coincide with oratorical gifts.

These considerations are set forth for discussion. Like many society papers, any merit they may or may not possess would be revealed by discussion. No destructive or captious spirit has suggested their postulation, and, to avoid misunderstanding, it may be stated that no particular technical society is referred to, the tendency which is herein criticized being very general.

The "Journal" would be glad to receive and publish any comment which the considerations put forth may suggest to its readers.

Workmen's Compensation in Great Britain

A Committee appointed by the British Home Office is at the present time seeking information on the working of the Compensation Act there, and on the desirability of establishing a state scheme of insurance against liability for compensation payments. In making preliminary enquiries from the coal industry, which has been selected as one of the best organized trades, it was found that because of the very high premiums charged by private offices, the Coal Controller had for some time had under consideration some relief from the onerous burdens of the existing situation. As the premium rate paid to private insurance offices is reckoned on the payroll, and as the rate of wages paid today is at least one hundred per cent higher than it was some years ago, it follows that compensation premiums have increased in the same ratio, while at the same time the risk had not substantially increased. Herein is exposed one of the many weaknesses of a compensation law which permits of private insurance against a liability imposed by national legislation. There is no justification for permitting private companies to make profit out of a statutory liability. The insurance companies in Great Britain are powerful institutions, and it may well be, as was the case in the State of New York, that they have exerted and will exert their influence to prevent the coming of a state system of compensation insurance.

In the matter of workmen's compensation legislation Great Britain was a pioneer, but legislation in that country has not kept pace with Canada and the United States inasmuch as the system of lump sum payments is adhered to, recourse to the courts in cases of disputes is allowed, and no proper system of pensions has been elaborated.

The method adopted in many of the provinces of Canada and most of the States of the American Union, of administration by a State Board, having judicial powers of decision, eliminating all common law liability and all recourse to the courts, having its own medical officers and avoiding all possibility of dispute between the injured person and his employer, is in every way to be preferred to the existing arrangement in Great Britain.

The inadequacy of lump-sum payments of compensation in cases of fatal injury must be admitted by all who have given dispassionate consideration to the position of dependent wives with large families. Insurance companies themselves have found it necessary to advise the payment of insurance benefits by an arrangement of monthly pensions in lieu of large single payments at death. The amount of compensation payable to the dependents should be as far as possible pro portioned to their need, and the wife with one or two or no children is in a very different position to the woman who is left with a large family of young children. A fixed payment at death cannot fill the necessities of varying circumstances, but a system of monthly payments based on the number and age of the children left dependent does permit of adaptation to the necessity of individual cases. It is difficult to understand how the lump-sum payment of compensation for fatal injuries, and compensation liability insurance through private offices has survived so long in Great Britain, and it can only be attributed to the fact that the labour leaders in that country have been following the will o' the wisp of socialism and other jack-o'-lanterns such as nationalization of mines instead of bending their energies to the accomplishment of practical reforms within reasonable compass of attainment, and already on the statute books of countries within the Empire.

In regard to the premium which an insurance company must ask for insurance against colliery disasters, it is quite evident that this must be high, because while the accident death rate of mineworkers averaged over a term of years and over all men employed in the industry is not relatively higher than many other trades in which the accident risks are popularly regarded as being ordinary, the gravity of the risk consists in the possibility that a large number of men in one mine may be killed at one time. The risk is a concentrated one, and the obvious course to minimise such a risk is to spread it over the whole industry and over as long a term of years as possible. This is exactly what disbursement of compensation payments through a state fund derived from collective assessment achieves. The method seems excellently well suited to equalise the peculiar risks attaching to the compensation liability of colliery enterprises, and its economy is undoubted, because a state board disburses exactly the amount prescribed by the Compensation Act, and no more, plus a negligible percentage for administration costs.

The By-Product Coke Ovens at Anyox B. C. and the Cassidy Colliery of the Granby Consolidated Mining and Smelting Company

By Our Victoria Correspondent.

To the enterprise of the Granby Consolidated Mining & Smelting Co. is to be credited the giving to British Columbia of the first important by-product coking plant on the Pacific Coast. The project, which was started during the war, was completed only a few months ago, the obstacles which were encountered, first in respect to the clearing of the necessary site at Anyox, the Company's mining centre on the northern Provincial coast, and second in the obtaining of material when what was required was at a premium in Europe, impeding progress somewhat more than was expected. Each difficulty however was surmounted and the modern 30 oven coke and by-product plant stands a monument to the faith of this great Company in the mineral possibilities of Canada's most westerly Province.

On July 9th of this year the first big red-hot cake of coke, measuring nearly nine feet high, forty feet long and nearly eighteen inches in width was pushed from one unit of the oven into the waiting car to carry it to the quenching station. That product, it is to be noted, was the first output of an installation which represents an expenditure of approximately $5,000,000, if the plant at Anyox and its attribute, the coal mines of Cassidy, Vancouver Island, are both considered. The coal used in the ovens under discussion comes from Cassidy, it should be understood, where the Company, having acquired coal lands, developed them, installed equipment modern in every respect, built houses for its officials and for its men that are unequalled in the provision made for the well being of employees on the continent. These mines now are producing consistently, the output is shipped by barge to Anyox and there converted into coke for the operation of the Company's smelter.

Of Anyox and its mines and its smelter, which contain the biggest copper converters in all of Canada, much has been written. The town itself and its works today represent an expenditure of practically $8,000,000. Of this amount more than one half was spent before the Company marketed a single pound of copper to the world. To keep the smelter going huge quantities of coke were purchased from the ovens of the Fernie district. Sometimes strikes, which happened too frequently, made the problem of copper production one of endless worry and great expense. At one time the Company was forced to bring its coke from Pennsylvannia. Hundreds of thousands of fuel oil have been transported to the northern camp.

Coke troubles, by virtue of the plant now in operation, are settled, while the vast amount of gas that is saved will be used in firing boilers in power houses when hydro conditions become such that water power is stilled by the lowering temperatures and ice. For the by-products there is a steady market.

Contrary to impressions which have been apparent this coke plant is not of foreign design. Every element of it is the product of the inventive genius of inventors of the North American Continent and every particle of material in its construction was fabricated in Canada, and much of it in British Columbia. The contract for its construction was taken over by the Foundation Company Ltd., of Montreal, and it may be said to be an "All British Product". Only such material as it was possible to obtain in Canada has gone into its construction while the army of skilled artisans who put it together was brought from all sections of the Dominion.

The construction work of the big coal bins, the offices, the huge stacks, the coke ovens themselves, the big gas holder, scrubber and benzol plant, by-products house, all are of concrete, presenting an imposing sight by day and marked by night by immense gas torches where the overflow of fuel burns incessantly. The plant entire spreads over several acres, room for which was blasted out of solid rock, or filled in with the same material. On an eminence to the north stands the smelter, while between the smelter and the coke plant lies the town of Anyox, and up the valley of Hidden Creek are the mines which furnish the ore. Viewed from the waterfront Anyox represents a big industrial concern where two thousand or more skilled workmen ply their vocations for twenty-four hours each day, working in eight hour shifts. The reaches of Granby Bay skirt the town limits, and docking facilities bring the coal from Cassidy almost to the open maw of the coke ovens.

F. M. SYLVESTER
Managing Director, Granby Consolidated Mining & Smelting Company.

Encased in brick of many and peculiar shapes, brick made by a special process, and under the heat of which ordinary fire brick would fuse, the ovens, thirty in number, spread over an area of more than 200 feet and are more than twenty feet in height. It is scarcely necessary to say that the by-product coking ovens create the coke by an entirely different method to the "beehive" ovens which are in use in the Crow's Nest Pass District. No flames touch the coal in its raw state, the fuel passing through flues made of the special brick referred to which so heats the oven walls so as to make them incandescent, thus forcing the coal to throw off its wealth in by-product.

In the carbonization of coal, which is accomplished by the application of heat at 2,400 deg. fahr. the coal gasses are driven off from the ovens to the collecting main, a large "U" shaped steel tank running the full length of the ovens and connected from each oven unit by ascension pipes. Through the collector main gases are conveyed through a series of piping to the by-product house where the gasses go through a condenser. It this condenser the temperatures are dropped, causing the precipitation of the tar and ammonia vapors. The gas then passes through the exhauster to the tar extractor where the remaining tar and ammonia is recovered.

The tar from the condensers and from the tar extractor flows to a tar separating tank and in this tank the tar and ammonia liquors are separated by gravity, the tar flowing to the tar storage tank and the ammonia liquor to the ammonia liquor receptacle. The ammonia liquor is then sent to the Ammonia Still where it is driven off in the form of gas which combines with the gasses leaving the tar extractor and all gases are then sent to the Saturator. In the Saturator the gases pass through a bath of sulphuric acid, the ammonia combining with the acid, forming ammonia salts, or ammonia sulphate. These salts are deposited in the Saturator, then conveyed to a draining table, and when a sufficient amount of salts have been collected it is placed in centrifugal dryers and the moisture driven out. Then the Ammonia Sulphate is ready for the market.

The operation at the by-product houses being completed all the gas passes to the final cooler in the benzol plant where the following by-products are obtained: Benzol and its homologues, which are toluol, solvent naphtha, crude naphtha and xylol. In the cooler the

General office, Cassidy Colliery, Vancouver Island.

gas is brought into direct contact with a water spray, and the naphthalene, as a result of the cooling gas, is carried off into a settling tank where the naphthalene floats to the top and is there skimmed off. The gas then goes from the final cooler to the scrubber, where the gas is washed and brought into direct contact with straw oil which absorbs the light oil in the gas. The latter then is carried to the gas-holder where it is stored. About 40 per cent of the entire amount of the gas generated is used in firing the coke ovens. The remainder will take the place of at least 1,800 barrels of oil daily during the winter months for heating the boilers of the power-houses which furnish compressed air to the mines and smelter.

The straw oil, or gas oil, which is a by-product of an oil refinery, takes from the gas the benzol and its homologues and the straw oil, when it has absorbed the light oil, becomes what is known as benzolized oil. It then is sent to a Still where it is thoroughly distilled and by the application of heat becomes benzol. The wash oil, when it collects in the Still, is sent to a cooler through a maze of pipes and is re-used in the scrubber. After the benzol has been driven off the temperature in the Still is increased and toluol is driven off. After this the temperature is again increased and solvent naphtha is driven off. By a process of re-distilling these products are made pure and marketable.

Coke Plant at Anyox, B. C. Smelter is seen in the distance.

The dimensions of the ovens are as follows:

At one end 18 inches wide, with a spread of three inches added to the other end in order that the big electric ram which pushes the coke from the oven will go clear; they are nine feet high inside measurement and forty feet long. With slight reduction that is the size of each cake or slab of coke as it leaves the oven.

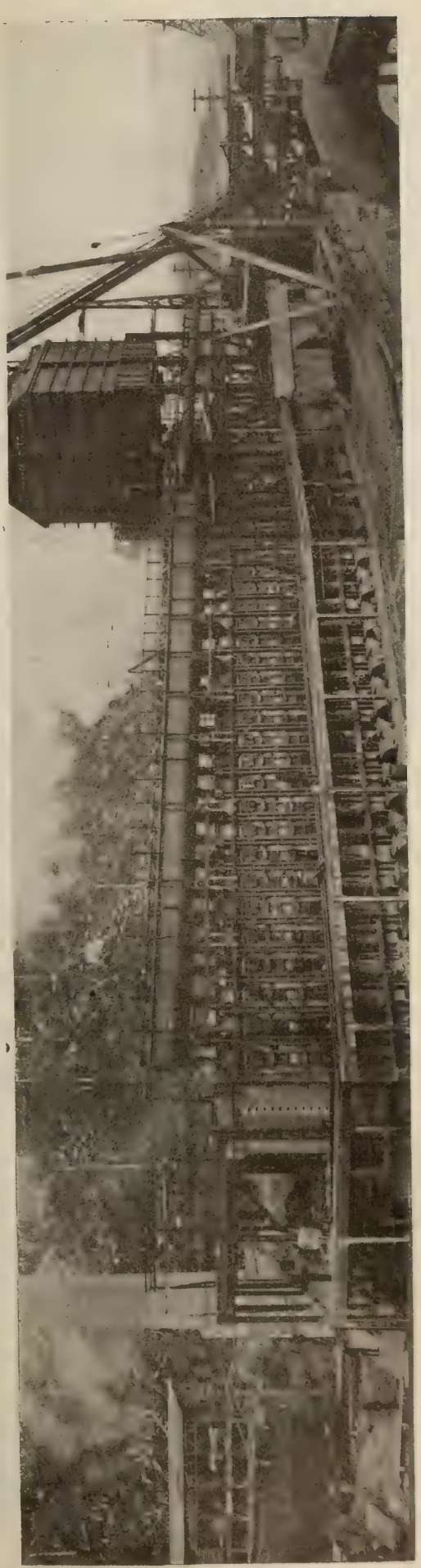
Charging of the ovens is done by the larry which is fed from the elevator at one end of the ovens where the pulverized coal has been transferred from the bunkers over an endless belt. This larry runs upon an electrified track, stopping over the hatches of each oven long enough to perform the mission of recharging. As the coal is carbonized to the finished state the oven doors are automatically removed from both sides of the ovens and an electric ram pushes the red hot cake of coke through the ovens and dumps it into a steel electrically propelled tramcar. It is then run into the quenching station, where water automatically flows upon it sending off great clouds of steam and shattering the coke by impact. It is then transported over the same line to coke bins conveniently placed where it is loaded into cars and makes its way to the smelter Each oven holds 13½ tons of raw coal which when carbonized leaves its residue of coke, 65% of the whole. The greater part of the balance has gone into by-products and gas. Carbonization in each one of the thirty ovens is effected in eighteen hours.

The by-product oven offers a complete solution of the fuel problem, the plant at Anyox having a capacity of 500 tons of coke daily. The raw coal passing through its transformation process is resolved into elements of solid and gaseous fuel, its impurities are removed and made into articles of commercial value, with a total loss of efficiency in the conversion that is already less than that of any gasifying process known.

Visualize the fleets of gasoline boats that may be supplied by the benzol alone that goes to waste in the ordinary process of raw coal consumption. It is a colorless liquid possessing great inflammability and mixed with gasoline takes up the burden of motive power at a cheap account. It is used in the manufacture of paints and as a solvent for rubber. It is used in explosives and in the preparation of perfume. Such are a few of its uses while its homologue ammonia, transformed into ammonium sulphate, furnishes a fertilizer market practically unlimited, particularly at this time as Chilean nitrate is becoming scarcer each year owing to the depletion of the mines.

From each single ton of raw coal out of the 13½ that are carbonized every eighteen hours in the ovens of the Granby plant, there results 65% of the total weight in coke and 11,500 cubic feet in gas, ten gallons of tar, 21 pounds of sulphate of ammonia, 3 gallons of light oil, 1.55 gallons of benzol, .40 gallons pure toluol, 30 gallons solvent naphthalene and 4 pounds crude naphthalene.

From the tar the by-products are so numerous as to be staggering in their possibilities. Creosote is extensively used in all seaport cities where docks and wharves are built as a preventative against the inroads of the teredo, while the application of pitch is too well known to need comment. An immensce tank of steel has been constructed at the Anyox plant to take care of the coal tar which runs in a steady stream from the coke ovens.



Coke side, Coke Ovens at Anyox, B. C., showing quenching car at left, and pusher at right.

While the establishment of this fine plant at Anyox is an outstanding accomplishment, the Company also is to be congratulated upon the splendid coal mining centre opened up at Cassidy, Vancouver Island. Cassidy is regarded as a model, having no duplicate on the North American continent. Its coal mine is believed to be the best equipped in the entire world, while the comforts provided for employees are far ahead of anything known in Canada. The townsite is laid out with wide streets, the whole design being most artistic. Native trees designate the names of the streets, such as Hemlock Street, Cedar Street, Fir Street and so on through the native arboreal nomenclature. The product of the entire nursery was purchased to make the town and streets attractive, while borders of flowers lend a piquant charm. Electrically lighted at night the streets give the appearance of a city of pretentions. Mr. F. M. Sylvester, Managing Director of the Company, is largely responsible, and the comments of those who visit Cassidy and the appreciation of those who live there strikingly indicate his success.

For the married employees there are cottages of the bungalow type on ample ground space no less than fifty by a hundred feet. The houses are of the most modern build and are provided with the most modern sanitary equipment. They have hot and cold water, electric light and sewage systems. One portion of the townsite has been laid out for sports. Here will be found baseball grounds, tennis, cricket, football, lacrosse. A running track also has been laid out. Its location is one that is admirable. From a height of land surrounding it forms a perfect amphitheatre. A gymnasium is being provided and everything necessary to physical culture is being adopted.

Cassidy Colliery, Vancouver Island.

A model is again encountered in the rooming houses for the single men, while the mess house bears out the same idea and thought of cleanliness and comfort. The mess house can be compared only to a first class hotel. Trailing vines and rosebushes lead the way to the entrances. A wash and change house is provided. Waitresses are in attendance upon the tables and the selection of food is made from a well-balanced and splendidly wholesome bill of fare. Tables are not of the old style where hundreds of men sat in rows and scrambled for food. Each table seats six men and each one of the six at every table in this dining room, where 200 men can be accommodated, is given "service". The kitchen is another model. It is as nearly electrically operated as is possible.

Hidden Creek Mine of the Granby Consolidated Mining Company. 150 ft. tunnel.

In the rooming houses the best that money can buy has been provided for comfort. In fact the room may be placed on plain with those found in the homes of the well-to-do. Up-to-date furniture is there, hot and cold water, steam heat. Each room in the two stories opens upon a verandah or balcony where flowers are growing. Every room is an outside room. The Company furnished the bed clothes and blanket. There is not an item overlooked to make these rooms sanitary and comfortable. Should a miner emerge from the mines with wet clothes there is an attendant to see to it that he gets clean and dry clothes to replace his soiled ones. Shower baths, hot and cold, form part of the scheme for cleanliness and health. The smallest detail along the lines indicated, besides the actual coal mine operations, receive the attention of R. R. Wilson the Superintendent.

The coal from Cassidy, that is supplied to the Coke plant at Anyox is mined from a slope following the dip of the seam at an angle of about eighteen degrees. This slope is open to a depth of about 2.000 feet. A manway has been provided as a safety-first measure and the men are not permitted to enter the mine by the working slope. The operations are pillar and stall. The mine is splendidly timbered. Every precaution known is taken against explosion and indeed against every form of accident. The men are provided with electric mine lanps and a sirocco fan, with a capacity of 150,000 cubic ft. of air a minute, is the mainspring of the ventilation system. An accident at the mine cannot affect the fan, the fan house being situated so that it cannot be interfered with. The fan house is built of concrete. Mechanical stokers feed the coal to the boiler furnaces from the sludge of the washery period. Exhaust steam is used for heating and its return is made from the pipes to the condensers and used over again. There is not a particle of waste coal. Even the refuse from the washery is flumed to a dump where it may be taken care of, it being thought that some day a use may be found for it. Utilization of every resource in the Cassidy coal plant is the theory upon which its designers have worked. Screens provide four grades of coal. Anyox get the small coal and varying grades are placed on the market. With Anyox extracting every available by-product from coal taken from Vancouver Island for coke production the way has been pointed to a most desirable revolution in coal mining methods in British Columbia.

—From "Iron & Steel of Canada."

The Hidden Creek Mine Camp.

Grizzley Screen With Adjustable Openings

John S. WATTS, New Glasgow, N. S.

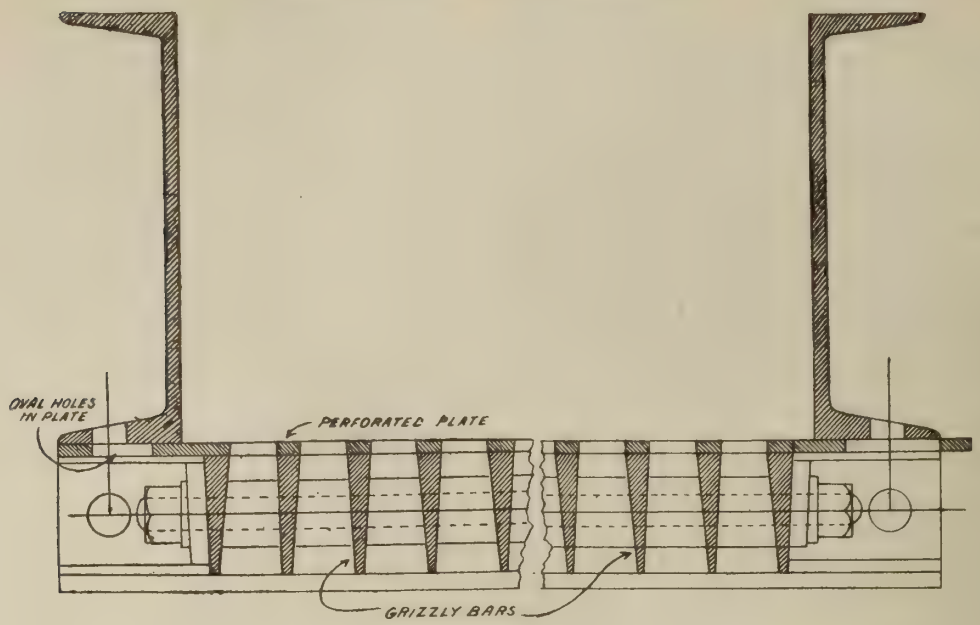


Fig. 1.

The accompanying sketch Fig. 1 shows the section of a grizzley screen, the openings in which can be adjusted to suit the working conditions. In screening out the fines from rock coming from a quarry it has been found that the width of opening, in the screen, which would be correct during dry weather, would be too fine to be efficient during wet weather and vice versa. The design shown will overcome this.

The distance pieces or spaces between the grizzley bars are made the width necessary to give the desired maximum opening, and the perforated plate is punched to suit as shown in the sketch, but with oval holes to take the bolts at the side, these holes being large enough to allow the perforated plate to slide an amount equal to the difference between the maximum and minimum openings.

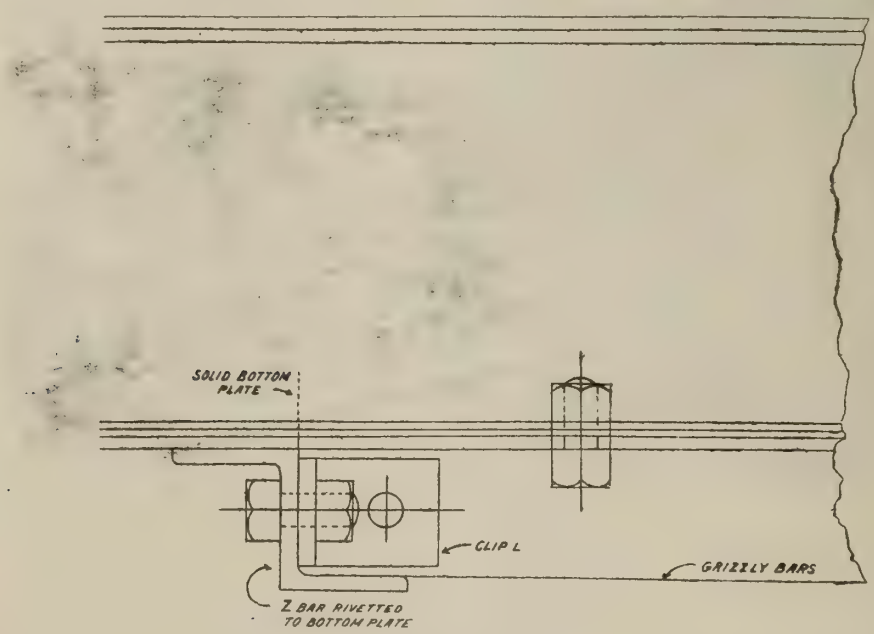


Fig. 2.

As shown in the drawing the plate is set for the maximum opening, when a smaller opening is required, the bolts at the sides are slackened, and the perforated plate slid over until the opening is closed to the desired amount.

As the screen will usually be run with the opening partly closed, it does not tend to get plugged up, and is easily cleared by simply sliding the plate to the full opening when any obstructions will fall out.

The method of construction is plainly shown in the drawing, see Fig. 2. The grizzley bars are held together by thro bolts and spacers, and rest at each end on 2 bars rivetted to the bottom plate of the chute.

CANADIAN COAL MEN.

Mr. Tonge was educated at Bolton High School, Bolton Institute, and Victoria University, Manchester, England. At the university he won numerous distinctions, including first-class honours and the Queen's Medal in coal mining. This led to his appointment as lecturer in mining in several townships under the Lancashire County Council. He subsequently became agent and general manager of the Hulton Collieries in Bolton; and it may be recorded that under his super vision the output of these collieries was trebled. Later he engaged in a general consulting practice, and was the first to introduce, in Lancashire, if not in England, the use of large stream turbo-generators in collieries and to apply electricity to the general operation of running them. Doubtless, in recognition of his special knowledge in this field he was appointed by the Lancashire Coal Owners' Association, the Manchester Geological and Mining Society, and the Lancashire Colliery Managers' Association to be the sole representative to give evidence before the Royal Commission on Electricity in Mines. In 1910 he was elected President of the Manchester Geological and Mining Society in succession to Sir W. E. Garforth.

MR. ALFRED J. TONGE,
General Superintendent Dominion Coal Company.

In 1912 Mr. Tonge accepted the position of Mining Engineer to the Dominion Coal Company, and removed to Canada in July of that year. In 1917 he became General Superintendent of Mines, and last year was appointed General Superintendent of the Coal Company. He joined the Institute as a member in 1913, and at the annual meeting this year was elected a Councillor for 1919-1920. He is also 1st Vice-President of the Mining Society of Nova Scotia.

There are just two courses open to Canada. She can shape her fiscal policies so as to encourage the development of her coal and iron resources, thereby assuring herself of a modicum of political independence, and some powers of military resistance, or she can resign herself to depending on the United States for coal and iron, or in other words, can place our country unreservedly at the mercy of our neighbors. This is the issue.—Canadian Mining Journal, issue 16th April, 1919.

So far as Canada is concerned the very title "Fuel Controller" expresses a misconception, unless indeed the Government had more in mind the importation of coal from the United States than the encouragement of production at home. What we need in Canada is not a fuel "Controller," but a fuel "Booster." The coal industry does not require controlling, or restricting, in any way. It needs to be encouraged, to be enlarged and amplified to the utmost extreme.—Canadian Mining Journal, 1st Sept., 1918.

GRANBY CONSOLIDATED MINING CO.

Report for 12 months ending 30 June, 1919.

Operating at a loss of $219,839 and showing a deficit of $984,409 after dividends, Granby Consolidated Mining, Smelting and Power Co., experienced a most unsatisfactory year in the 12 months ended June 30 last. The slowness with which copper moved after the armistice in November, 1918, and the construction of the new coking and by-products plant necessitated the raising of bank loans to $5,035,243.

It cost the company 23 cents a pound to produce its copper last year while the average price received for copper actually sold was but 17,714 cents a pound.

The company sold but little more copper during the past fiscal year than it carried forward into the present 12 months as here remained on June 30 last, 12,001,573 pounds unsold which had been shipped at an average price of 16.23 cents a pound. Sales during the past year amounted to 16,333,137 pounds at an average price of 17,714 cents a pound.

Granby sold 395,915 ounces of silver at $1.0143 an ounce and carried into the new year 172,093 ounces which was inventoried at $1. Of the gold yield the company sold 13,657 ounces and had 9732 ounces at the year end, both sales and inventory being at $20 an ounce.

Including a relatively small amount of purchased material the Granby smelters treated 1,007,862 tons of ore from which there was recovered 28,334,710 pounds of copper, 568,008 ounces of silver and 23,389 ounces of gold. Hidden Creek mines contributed 21,012,301 pounds while the Phoenix mines, now closed, furnished 6.108,314 pounds.

The average yield of all the company's mines was 27.97 pounds of copper per ton of ore. The highest average recovered was from ore at the IT mine which yielded 97.33 pounds per ton for a production of 151,829 pounds of copper. The Midas mine showed an average yield of 46.08 pounds and a production of 343,645 pounds. The average of the Phoenix mine was 19.51 pounds and the Hidden Creek mine 31.6 pounds

Granby's balance sheet as of June 30 last shows current assets of $5,692,087 against current liabilities of $6,108,744. Under the latter heading were bank loans of $5,035,243; accounts payable of $518.413 and accrued charges of $555,089. Current assets included cash of $83,774; accounts receivable 253,304; copper, gold and silver on hand, $1,963,264; metals in process and ore $1,020,279; material and merchandise $2,371,466; and total inventory of $5,355,008 assigned June 30 and subsequently securing bank loans.

Development work during the past fiscal year added 1,321,250 tons to Granby's reserves against which there was extracted 664,847 tons. This applied to the Hidden Creek mine which now has 11,500,850 tons of ore. The old Phoenix property, shut down at the present time, has 2,513,636 tons of ore of average grade of which the management believes one half remains available. The average grade of ore mined at Hidden Creek during the year was 1.88 per cent copper against 2.14 per cent in the previous year and 2.08 per cent two years ago. The mining cost at this property last year was $1,389 a ton against $1,207 a ton in the previous 12 months.

NEW YUKON BULWARK.

News of the pronounced success of the cold water thawing process in the treatment of frozen alluvial placers is among the best that ever was announced in the Klondike. It is given on authority that the thawing by that process beyond question is more satisfactory than the old steam system of thawing. and that the ground not only is better adapted to dredging but that the costs of thawing will be less than half. This means the bringing into the workable range of hundreds of miles of creeks near Dawson which heretofore were considered of questionable value. This will be the case in particular when normal prices of outside supplies are restored, and for the present the saving on thawing will act as an offset to the high costs, thus making it possible for the large companies to continue their work in this camp.

By reason of high prices, gold having a fixed standard of value, purchases today only half what it did in pre-war or normal times. Hence there was urgent need of some discovery for working frozen placers at lower cost if the works are to continue during the tiding over period. In face of the fact the gold brings relatively little in the market now, tha is, that it takes so much of it to buy the necessary food and equipment for the operations, the gold mining operator cannot afford to advance wages on low grade propositions. It is inevitable he shut down when it comes to working low grade properties unless the newer and less expensive method of work be introduced or unless the government bonus the gold miner.

Not all gold operations, however, are in such places that the gold water thawing can be applied, and the government bonus also will be a pillar under the industry. Other mineral yields have been stimulated by that process. Why not gold? At the same time a vast area of the gold gravels of this region are of the kind where cold water thawing is adaptable, and the new process therefore may be counted another pillar under Klondike both for the present and for the future. Not only Klondike, but the entire vast frozen empire of the North from Bering sea to the Rockies, and possibly in future fields beyond will benefit from the process. Siberia will come in for its share of the good. It seems the whole top of the earth—the frozen era—will throb anew with gold industries from this new process, and first among the beneficiaries will be Klondike.—Dawson Weekly News.

How long will Canadians be content to follow the American cart around, picking up what coal drops on the road? How long will the nightmare of frozen impotence oppress and depress our people? The waste of our neglected coalfields never proclaimed Canada's immaturity and shame so strikingly as today, when a huge burden of national debt is lodged on the country's shoulders, and demands for our future welfare the use of every natural bounty available for development.—Montreal "Star," Nov., 1919.

From the national point of view, the increased revenues of the Customs Department in import duties is scarcely sufficient to offset the foolishness of spending millions on the purchase of United States coal, while simultaneously the Canadian coal production is steadily dropping. The effect on our national finances is tantamount to raising a loan in the United States at high rates of interest, and it adversely affects both our money exchanges with New York, and our national earning power, to say nothing of the larger question of dependence upon our neighbours for such an essential weapon of warfare as coal.

THE ADVANCE IN SILVER.

Explanation of Rise in Price to be Found Chiefly in Far East.

New York.—For an explanation of rise in the price of silver to above gold parity of silver dollars, one must look chiefly to the Far East. It is principally demanded from that quarter, first from India and latterly from China, which has driven the price to a level not witnessed in almost five decades.

Not many months after outbreak of the war, a scarcity of silver rupees appeared in India. With the placing of orders for Indian products by the Allied nations, the interior trade of the country commenced to expand on an enormous scale, and the requirements of the media of payment increased correspondingly. At the same time the political disaffection in India, which was more or less instigated by German agents, resulted in the public showing a decided preference for silver rupees as against paper currency, which is redeemable in silver coins.

In order to supply itself with silver and meet increased demand for the coins, the Indian government first turned to China. In 1915, Shanghai had a superabundant supply of the metal. Stocks amounted then to 96,000,000 ounces, which was an abnormally high figure. But in the course of the next few years, drafts made by India reduced supplies until they stood at the exceedingly low figure of 20,000,000 ounces in the early part of 1918.

It was now impossible for India to secure any further amounts of the white metal from China. But need of it was more pressing than ever, inasmuch as the native population had made a veritable run on the treasury, presenting notes for redemption in silver rupees. At this critical juncture, the Indian government through Great Britain appealed to the United States which had the only available stock of silver in the world, consisting of about $568,209,000 silver dollars. Responding to this appeal, the United States Congress enacted in April of 1918 the Pittman act, which empowered the secretary of the treasury to melt down and ship to India a maximum of 350,000 silver dollars.

So acute was the crisis at the time in India that silver was shipped by the United States government even before the Pittman law was passed. It has been stated that had the shipments been delayed a few weeks, the Indian currency reserve would have been exhausted and the Indian government would have been forced to suspend payment on its currency notes.

A total of 260,000,000 silver dollars were reduced to bullion and sent to India. It is understood the Indian government paid $1.101½ an ounce for the metal.

In the meantime, in order to conserve whatever stocks of silver were in the market, here and in Canada, the United States and Canadian Governments promulgated an embargo on all private exports of the metal. Ban continued until the middle of the present year, and with its removal the United States Government discontinued making any further shipments to India.

Since cessation of silver exports from this country to India, the Indian government has remained out of the market for silver. It has instead been fortifying its currency reserve with gold, which it has secured in this country and in London. Virtually all offerings of Transvaal gold made in London are now finding their way to India.

By the time demand of silver from there ceased, world shipping conditions had improved to such an extent that China was able to roll up a tremendous favorable balance has been chiefly met with shipments of the white metal from the United States, and the Chinese bank reserves, which were depleted by the Indian drain, have been thus replenished. In spite of the recent sharp advance in price for silver, Far Eastern exchanges continue to rule above the silver export parity. Thus China is still in a position to take silver from this country.—Boston News Bureau.

WORLD'S COAL PRODUCTION.

In the last year before the war the world's total output of coal approached a billion and a half tons, being 1,478,000,000 tons in round figures. The outbreak of hostilities caused a tremendous drop in production which had reached its lowest point in 1915, when production declined to 1,312,000,000 tons. Thereafter as the warring powers realized that the struggle was one of munitions quite as much as of men the world's production was greatly increased. During the last two years of the war it reached a level approximately that of 1913, being 1,473,000,000 tons in 1917 and 1,468,000,000 tons in 1918, as nearly as can be estimated, as exact figures cannot be obtained for Central and Eastern Europe during the war period.

All of the great coal fields of Europe lay within the belligerent countries, and in all of them production declined. Even those districts that were fortunate enough to escape devastation suffered from lack of man power and transport. Deprived of their normal imports from England and Germany, the neutrals and Itly endeavored to increase the output from their scant resources. The stimulus to production supplied by the scarcity in Europe was felt even in Africa, the South Seas, and the Orient.

Upon the United States, however, fell the chief burden of making up the deficit caused by the war. In 1913 the country was contributing 38.5 per cent of the world supply. During the war its share increased at the rate of about 2 per cent per year, until in 1918 approximately 46 per cent of the world's output of coal came from the United States.

PERSONALS.

Dr. J. Mackitosh Bell is at Almonte, Ontario. He is to give a series of 10 lectures, each dealing with a prominent mining area in Eastern Canada, Australasia and Siberia, at Harvard University in January. He will make his headquarters in Toronto.

Mr. C. E. Smith has been elected chairman of the Toronto branch of the Canadian Mining Institute.

Mr. J. C. Murray is at Port Arthur, being interested in development of properties in that district.

Mr. D. H. McDougall, President of the Canadian Mining Institute, is expected to sail from England for Canada about the 25th November.

Our readers will know that this journal urged for over a decade serious consideration of the dangers that lie in our utter dependence on the United States for a coal supply. We have submitted the proposition that economic dependence sooner or later must bring political subservience, and we can see no escape from the implications of this proposition.—Canadian Mining Journal, issue of 16th July, 1919.

Special Correspondence

BRITISH COLUMBIA.

Barkerville, B.C.

The district of which the historic town of Barkerville is the centre, well known to all old-time Cariboo prospectors, is described as being all agog with pleasurable anticipation of the permanent rehabilitation of the mining industry next year.

This activity is attributed to the quartz claims situated on Proserpine Mountain, about four miles to the north of the town, having been acquired by the Mining Corporation of Canada, headquarters Toronto, Ont., and the plans the latter have decided on, and already have commenced carrying out, for their development.

Under the direction of Robert H. Bryce, late of Cobalt and Porcupine, a crew of more than fifty men is now at work. Cabins have been built providing sleeping and eating accommodations for one hundred men, together with offices and other necessary buildings. John Bell, an old-timer in the district, has taken a contract for the driving of two tunnels of 200 feet each, while I. E. Moore has a contract for a third and a fourth is to be constructed. Two diamond drills are being shipped to the property and will be at work before long.

In short the lode is to be as thoroughly explored as possible before spring, between $70,000 and $100,000 being spent in test work alone. If the results are satisfactory, indicating that the values continue at depth, the town of Barkerville will be made and the district generally will benefit materially. That such will be the outcome appears to be the confident opinion of the company, prospectors, and all residents. The surface showing is good; the outcrops show a depth of at least 800 feet from the summit, and at that depth the width of the ledges holds uniform, one being 17 and the other 42 feet. The average assays hold all along this depth, the values to the ton being, roughly speaking, $17.

J. D. Galloway, Government Mining Engineer, who returned recently from the district, refers enthusiastically to the outlook. After speaking of the proposed work of the Mining Corporation of Canada, he says that open cuts, shafts and tunnels are being dug into the hill with the object of proving before spring whether the property is a big low-grade gold property or nothing at all. All indications are most favorable, he says, that the results will be good. He states that, as a result of this company's activity, there has been a small-sized stampede into the Barkerville section, that claims have been staked all over the country, and considerable prospecting has been done. "There is good reason to suppose," he concludes, "that other properties will be discovered as a result of this work and that Barkerville will again come to the front as a gold mining camp."

Kamloops, B.C.

The difficulty of obtaining labor is hampering the completion of a number of British Columbia enterprises which are expected to benefit the mining industry. One of these is the branch line of the Canadian National Railways between Kamloops and Kelowna by way of Grande Prairie and Vernon. Another is the branch railroad from the Kettle Valley Railway to Copper Mountain, where the Canada Copper Company is opening up, on a large scale, extensive deposits of low grade copper. A third is the construction by the Kootenay Power & Light Company of its power line from Bonnington Falls, where the power is developed, to Princeton, where it is to be used by the Canada Copper Company in its new mill. The new Kamloops—Kelowna Branch Road will afford transportation facilities necessary to the development of the gypsum deposits at Grande Prairie, which are owned by the Manitoba Gypsum Company and said to be of enormous extent.

Nelson, B.C.

John R. Cassin, president of the California Mining Company, states that the process by which the ore of the California Mine, situated near Nelson, B.C., is to be treated has been decided and that the necessary new machinery is to be ordered. Experimentation with the gold-silver ore of this property, carried on at the Athabasca Mill, provided the basis on which the process was determined. At present the mill, which was built to treat Athabasca Mine ore, is purely a stamp mill. To the ten stamps will be added a ball mill which will be used for primary grinding and which will operate in a close circuit with the classifier The product will pass over the Senn amalgamating tables and finally will be treated by oil flotation. The experiments indicate that 90 per cent of the values may be recovered by the treatment outlined. No extension of the mill building will be required. The capacity of 25 to 30 tons may be increased by putting in additional grinders and tables, as the output may necessitate.

Some indignation is expressed in British Columbia mining circles because of the reports that Great Britain has been an inquirer in the United States for large quantities of zinc when difficulty is being experienced in the moving of Canadian zinc for want of a market. F. A. Starkey, commissioner of the Associated Boards of Trade for Eastern British Columbia has taken the matter up with Sir Robert Borden, Premier of Canada as follows:

"Sir: The reason for submitting you a copy of the enclosed resolution passed at the annual convention of the Associated Boards of Trade of Eastern British Columbia is for the purpose of impressing upon you the serious need for consideration of the request made therein, which is that a preference be given to the Dominions and Colonies by the Government of Great Britain in-so-far as the purchasing of raw and manufactured material is concerned.

Attached thereto you will note a clipping from the Engineering and Mining Journal, New York, which is an acknowledge authority on the metal markets. It will be seen that Great Britain, France and Belgium are all making inquiries for both lead and zinc metals. It is also shown that it is not the first purchase in quantities Great Britain has made in the United States market.

Therefore, we are most desirous to have your Government impress upon the Government of Great Britain the importance and imperative need of a preference being given to the Dominions and the Colonies in purchasing our raw and manufactured goods which, if consummated would be the means of bringing about a more favorable balance of trade in Canada's favor, thereby increasing the volume of trade within the Empire.

Hoping for your attention and personal consideration."

The resolution referred to requested the Prime Minister, then a delegate to the Peace Conference, to "place before the British Government the strong advisability of the British Dominions and Colonies being given a preference in the purchase of supplies for the reconstruction of devastated Europe; and for making good stocks of raw and manufactured material which have been depleted as a result of the war."

Thirty-five owners of mining properties, some of which are under development and some staked preparatory to similar work, are petitioning the Government to assist in the construction of a road to facilitate transportation. If the Government builds the road wanted, a further distance of 10 miles from what is known as the Edgewood-Pre-emption road, to Deep Creek on the Vernon Highway, it will bring the road within twelve miles of the camp and materially cut down ore shipping charges. The Killarney, Waterloo, and Rampolla Groups of mineral claims are reported to be showing up very satisfactorily and operators are looking forward to splendid results next season.

Vancouver, B.C.

With the depreciation in the purchasing power of gold the system of taxation of gold mines of the Province has become obsolete and unfair in the judgment of some members of the British Columbia Chamber of Mines. If the gold mining industry is to be maintained, they hold, the fundamental principle in fixing taxes must be the ability of the properties assessed to pay. Owing to the fact that, since taxes last were adjusted, mining costs had practically doubled. A joint committee, representing the B.C. Chamber of Mines, the Canadian Mining Institute, and the mine owners, has been appointed to investigate the matter and submit a report with a view to making whatever representations are thought advisable to the Provincial Government before the next session of the Legislature.

Golden, B.C.

The Tarheel Copper Mines, Golden Mining Division, are reported to have passed out of the control of J. C. Lincke, a majority interest having been secured by Calgary business men. A company has been formed and it is proposed proceeding with development. A contract will be let for the driving of a 100 foot cross-cut tunnel to tap the ore body. Transportation facilities are to be improved to the end that the ore may be hauled direct and by a shorter route to the Kootenay Central Railroad at Parson Station. The Provincial Government is constructing a road from Parson to open up the Spillimachene River Section which, it is asserted, will be the natural outlet for the mineral of that district.

Victoria, B.C.

With the announcement from Ottawa that the Governor-General-in-Council had ordered that no coal could be exported from Canada except under license issued on the recommendation of the Canadian Trade Commission, not a little consternation was manifested by the coal operators of British Columbia. The Collieries of Vancouver Island had been producing to capacity and taking care of both the domestic trade as well as the exceptional demand of the Sate of Washington, the latter undoubtedly created through the recent labor troubles on the American side. That is to say they had been providing ample for the home requirements and disposing of the surplus in Washington.

Consequently the news of Ottawa's action came as a disagreeable surprise. They argued that, as long as no one in British Columbia suffered, the Island Collieries should be permitted to export. Hon. Wm. Sloan, Minister of Mines, who has been keeping an eye on the situation ever since the American strike, and who had been assured by the operators that nothing would be done to create a local fuel shortage, was approached to intervene with the Dominion Government. He promptly took this step and was advised that the export of coal, under such conditions as obtain in the Pacific Northwest, would not be interfered with. At any rate that was the construction generally placed upon the word which came from the Capital and, as a result, the collieries of Vancouver Island are not up to date affected, nor is their trade; it being possible to secure all the licenses required.

In a statement Mr. Sloan pointed out that during the year 1918 sales of British Columbia coal for consumption in Canada amounted to 1,010,938 tons, while 752,821 tons were sold for export to the United States and 58,417 tons were sold for export to other countries. It, therefore, was apparent that the Collieries of the Province were dependent to a very large extent on their export trade and it would be dangerous to interfere with it.

Some alarm was created shortly after the Ottawa order came to hand by a report that the management of one of the principal collieries had stated that, if the regulation were enforced, it would be necessary to close down the mine. This, however, was flouted by Mr. G. W. Bowen, general manager of the Canadian Western Fuel Company, who described it as nonsence.

The Canadian Western Fuel Company has announced that the price of its coal in British Columbia will be raised $1.00 a ton, the same to take effect immediately. It was explained that this advance was made on October 1 on all coal exported to Seattle and other points in the United States. The increase in the local price was deferred, it is stated by the operators, because it was believed that local conditions might so alter as to make it unnecessary. While the Western Fuel Company is the only Company to make the advance thus far it is considered likely that others will follow suit.

This change in price brings local standard lump coal to $12.50 a ton. The Seattle price to the consumer for the same coal runs between $14 and $15, according to the district in which it is delivered.

Reasons given for the increase are that the Canadian Western Fuel Company, in the exploitation of the Nanaimo Mines, finds that the percentage of lump coal has dropped from eighty to forty-eight per cent of the output; that there is little demand for the smaller grades although it costs more to handle; and that extension of the underground workings and the decline of some of the best seams, has resulted in longer and, of course, more expensive haulage, which has brought down the production per man per day from three and four tons to one and one-half tons.

It is stated that the greater quantity of the lower grades of coal are shipped to Washington, the greater percentage of British Columbia consumers insisting on having the lump coal.

Prince Rupert, B.C.

All fear of a coal famine this winter at Prince Rupert has been dispelled by the assurance that the city's requirements can be adequately cared for by the mines at Telkwa, a short distance inland on the line of the Grand Trunk Pacific Ry.

Dawson, Y.T.

The Yukon Gold Company has paid $2,500 to each of the four widows of its employees who died of poisoning after eating a meal at the Hunker Boarding House. It was not clear whether the case came under the Workmen's Compensation Act, so the company offered the settlement indicated, which was accepted. The widow of another man, not an employee of the company, but who partook of the fatal meal, was given $1,000. In all 12 men died, eight having no dependents, and several others were taken sick and were ill for some time. These latter were paid half time during their illness.

Trail, B.C.

Ore receipts in gross tons at the Trail Smelter of the Consolidated Mining & Smelting Company for the week from November 1 to 7 inclusive totalled 4,233 tons, making the aggregate for the year 279,828 tons. Of the independent shippers the largest contributors were: Josie, Rossland, 249 tons; North Star, Kimberley, 376; Rambler-Cariboo, Rambler, 235; Ruth, Cedar Creek, 115; Silver Standard, Silverton, 293. The Centre Star, Rossland, was the only considerable shipper among the company's properties, its total being 2,319 tons. The strike still is in effect at Kimberley, so that the Sullivan Mine is not producing.

Lethbridge, Alberta.

Before the Alberta Coal Commission in Lethbridge it was declared by A. Bryant, representing the miners of Chinook Collieries, that much of the recent One Big Union strike trouble in District No. 18, U.M.W. of A. was caused by the agitators doing the thinking for the miners. When the strike was at its height the miners had voted to break away from the U.M.W. of A. and join the O.B.U. but later they had deserted the O.B.U. and again gone with the International. Two weeks later they had been swayed by the O.B.U. agitators and reversed their decision only to change their minds subsequently when it was thought better to retain their international affiliations. This evidence strongly substantiated the testimony of Commissioner Laughran, representing District No. 18, U. M.W. of A., who declared that much of the instability in the coal mines' industry in the Province of Alberta was caused by agitators who so easily swayed the rank and file that it made it almost impossible for the district officers to follow a straight course. Without these irresponsible spirits there would be fewer rash promises to the men and less pithead strikes.

Victoria, B.C.

Hon. T. D. Pattullo, Minister of Lands in the British Columbia Government, is in Ottawa interviewing the Dominion Government with reference, among other matters, to the construction of a branch of the Grand Trunk Pacific Railway into the Ground-Hog Coal Country. Situated at the headwaters of the Naas River in central British Columbia, the Ground-Hog is regarded as one of the richest coal areas of America. As yet it is altogether undeveloped. But there are showings, some of them of anthracite, which extend for miles across the country and the Provincial Government believes that if a railway can be secured to tap this section a great coal camp soon would be established. Such a road would have to be constructed from Hazelton, or some convenient point near that town, as the Ground-Hog is almost due north of Hazelton.

C. M. I. TORONTO BRANCH MEETING.

Minister of Mines and Attorney General Address Institute Branch Meeting.

The new Ontario Government was represented at the luncheon meeting of the Toronto branch of the Canadian Mining Institute, Saturday, November 15, by Hon. Harry Mills, Minister of Mines and Hon. W. E. Raney, Attorney-General. They were introduced by Mr. J. R. Tyrrell, chairman of the branch, who pointed out that most mining engineers intend to own a farm some day and should be regarded as potential farmers at least. He hoped therefore that the Ministers would find themselves in congenial company.

The Minister of Mines made it clear in a few words that he intends to devote his attention to development of mineral resources rather than to labor propoganda. He was chosen by the labor party as one of their representatives in the Cabinet, but he does not consider his work as Minister of Mines should be taken advantage of to further the interests of any class. He will expect the Department of Labor to deal with labor matters while he will devote his attention to the production of minerals. He said he recognized, as his constituents well recognize, that capital is necessary for the development of natural resources and he intended to do whatever he could to bring capital to the country for the mining industry. As a resident of Fort William he feels that Northern Ontario has a great future and that it has not yet received the recognition it deserves. He will endeavor to put Northwestern Ontario more prominently on the map.

The Attorney-General in a short address gave some idea of the aims of the new government and claimed that while it is a government, chosen by the farmers and labor, yet the Ministers can be counted upon to give all classes a fair deal. One of his first acts was to get rid of the political party governments, and he states that every endeavor will be made to win justice for all.

After the Ministers had spoken, Chairman Tyrrell called on Dr. W. G. Miller, a past president of the Institute and Prof. H. E. T. Haultain. Dr. Miller pointed out that development of mineral resources depended largely on the initiative of men who were ready to venture so long as they had good grounds for believing they would profit greatly if their ventures proved successful. The nickel industry in Ontario is a case in point, for the men who developed the nickel industry had a long hard struggle before they achieved success.

Professor Haultain thanked the Ministers for their plain speaking, and stated that he had never before had the pleasure of hearing Cabinet Ministers express themselves so frankly and simply. He thought that mining engineers would become more interested in politics if the people would approve of straightforward talk and action. As one of the senior members of the Mining Institute he invited the Hon. Mr. Mills to apply for admission to membership in the Institute.

The election of new officers for the branch resulted as follows: Chairman, C. E. Smith; vice-chairman, J. B. Tyrrell; secretary, J. P. MacGregor.

The Toronto branch holds meetings every two or three weeks during the winter months. Most of these are luncheon meetings on Saturdays at the Engineers' Club. There were 35 present at the meeting last Satuday. R. E. H.

Note:—A short account of this meeting appeared in the last "Journal," for the additional details given warrant a second mention of an unusual gathering.—Ed

Nova Scotia Notes

Following the explanation of the Nova Scotia coal operators that they could not grant the schedule of wages asked by U. M. W. of Nova Scotia in replacement of the existing schedule, the union has asked for a Board of Conciliation which it is announced from Ottawa will be granted. It is also understood that this Board will be asked to consider the wage question at all the collieries in Nova Scotia The composition of the Board has not yet been selected. but it is understood that Mr. J. C. Watters will probably be the nominee of the U. M. W. of Nova Scotia.

The Secretary of the United Mine Workers states that the union has not, as reported in the newspapers, agreed to the sending of coal from Nova Scotia to New England ports in proportion to the amount of United States coal supplied to Canada during the U. M. W. strike in the States. The Secretary's statement as reported in the Glace Bay "Gazette" is as follows:

"Our position is this—we refuse to let any coal be shipped into the United States while this strike is on; it is not a question of exchanging coal. The U. M. W. executive discussed this matter with Mr. Magrath at Truro, a couple of days ago. The U. M. W. will refuse to let any Canadian coal be shipped to the States."

This rather ties Mr. Magrath's hands, as there is no practicable method by which Nova Scotia coal can be delivered in the central provinces of Canada now that navigation is about closed in the St. Lawrence. It also rather effectually disposes of some of the arguments of influential persons in Ottawa who have advocated the extension of the jurisdiction of United States' labor organizations into Canada, and were particularly convinced of the benefits that Canada would experience when it came under the benign sway of U. M. W. headquarters at Indianapolis.

As a matter of practical politics, however, Ottawa will dispose of the available coal of Canadian origin to the best of its ability in order to keep Canadian citizens from freezing to death.

The Dominion Coal Company has made a number of improvements in its practice recently, which while not very important in detail, will in their combined effect tell favourably on costs and production.

Particular attention has been paid to the economy of compressed air, and pipe ranges of insufficient diameter, have been replaced by pipes of larger diameter. An investigation of the many little sources of air leaks has been undertaken, something that must be done every little while. The use of the portable air meter has proved of great advantage as a discoverer of unsuspected leaks and obstructions.

The undersea territory of some of the Phalen mines is being rapidly developed. The pillarage which must be left in the submarine tracts lessens the amount of extractable coal per acre, and necessitates a more extended and more rapid driving of the "narrow-work" than is required in the land areas. Double-shifting of the narrow work places is therefore required.

The pumping stations of the Company are also being concentrated. Larger lodgements, or gathering places for the water are being provided, and electrically-driven centrifugal pumps are being substituted for the air-driven pumps. The electric current is usually led down a borehole, and the pump discharges to the surface through a cased bore of large diameter, usually twelve inches. Special provision is being made for dealing with the submarine areas, and the main pumping stations are situated as near the shore as possible, and are designed with special reference to the possibilities of undersea mining.

An unusual amount of prospecting has been done during the past few months on the Dominion Coal Company's areas, chiefly with regard to the lower seams, Emery, Gardiner and Mullins. The approximate position of these seams is of course known, but before accurate projections can be made for future openings, the seam must be actually uncovered and exactly located.

The Glace Bay "Gazette" suggests that the Dominion Coal Company has a good opportunity, in entering the North Sydney coalfield to create a model mining community, and the advice is good. There is just one way in which the ideal community can be brought about, which is one of the exemplifications of the possibilities for good in a monopoly The Corporation that undertakes to create an entirely new mining community in an unpopulated district should be sole owner of all the adjacent property, and should itself own and control every municipal facility. The district of New Waterford is pointed to as an example of a good opportunity missed, and all who know that district will agree. The Dominion Coal Company in the first instance provided streets, lights, water and transportation, but the real estate speculator reaped the benefit, while the Company pays the major portion of the taxes.

The Sydney "Post" quotes the Glace Bay Gazette's editorial, which is unfortunately too long to be repeated in these columns, and makes the following comment thereon:

> "If the expectations of the Dominion Coal Company's experts as to the value of the Bonar Head coal for metallurgical purposes are realized, this colliery is certain to become, in the not distant future, the centre of one of the large mining towns of Cape Breton. Timely measures should therefore be adopted by the Coal Company to protect the people against the greed of real estate speculators in this district. Extortionate prices for dwelling lots and business sites are among the conspiring factors in high rents and burdensome living expenses. High rents and excessive prices for the necessaries of life are in turn responsible for much to the prevailing unrest among industrial workers. If is as much to the interest of the Dominion Coal Company as to that of its employees, to take the necessary steps to have plenty land available, at moderate prices, for residential and business purposes, within easy distance of the new mine at Bonar Head. It is often said that it is easy to be wise after the event. The Coal Company has had more than enough experience to give it wisdom in this connection."

Mr. J. P. Gordon, on whose property at Copper Lake a sensational gold discovery was made this summer, has gone to the property by dog team. It is probable that development work will be carried on vigorously next summer and the necessary supplies can most easily be assembled in the winter.

Manitoba Notes

Gold Pan.

Arrangements are being made for the resumption of development operations at the Gold Pan mine. The pumps have been in operation for some time and the mine is now dewatered. Mr. J. B. Tyrrell will visit the property shortly to complete his examination and advise the directors concerning development of the ore deposit.

Brooklyn.

Shaft sinking has been resumed at the Brooklyn. At the 100 ft. level some drifting was done and Foreman MacDonald reports that very good ore was broken, there being an abundance of five grains of gold visible in the ore. Owing to the heavy snowfalls and the lack of frost in the ground the roads have been in very bad shape and the company has had difficulty in obtaining the necessary wood for the boilers. It is expected that this difficulty will soon be overcome. At present the miners are drilling by hand. Superintendent Anderson who has been on a trip to Buffalo has returned to the mine.

Better road needed.

The operators in the Rice Lake district are not receiving the encouragement from the Manitoba Government that the pioneers in a new industry deserve. The development of the gold deposits will mean much profitable business for the people of Winnipeg, but there is no general appreciation of this fact yet. The winter road from Fort Alexander should receive some attention. The government has not even cut out the summer windfalls. Manitoba has yet to experience what the development of mineral resources means in the form of markets for supplies for companies and miners and their families. Ontario mining companies spend millions of dollars annually for supplies and their employees spend millions for food, clothing, housing and other necessaries. The Manitoba Government would do well to help build up such an industry in that province.

Flin-Flon.

While the reported sale of the great Flin-Flon ore deposit to Hagden Stone & Co. of Boston has been denied, the property will receive some attention this winter. It is planned to open up the ore body by shaft and lateral work underground. The information so far obtainable is from the results of surface examination and numerous diamond drill holes. The proposed development work will be the first mining to be done on the property. The diamond drilling showed that there is an enormous body of ore.

LIGHT RAILWAYS FOR THE NORTH.

Toronto Company formed and work of constructing narrow gauge lines to start in the Spring.—Meeting of Ontario section Mechanical Engineers. Toronto Notes.

(Staff correspondence Canadian Mining Journal)

Toronto mining interest are much interested in the formation of the Canadian Light Railway Construction Company, Limited, with an authorized capital of $500,000 for the purpose of building light narrow gauge railways in the outlying mining districts of Northern Ontario The company, which has been incorporated in Toronto, included J. Roebuck, C. J. Corless and W. B. Jones and is headed by Mr. Solo-way. It is announced that work will not be commenced until spring and that the first section built will be between Elk Lake and Gowganda, a distance of 28 miles which will take about two months to construct. A system of roads such as it is proposed to construct after the style of the light railways for rations and munitions in France and Belgium, should command considerable assistance from the Ontario Government by reason of the fact that the Government would be relieved of the burden of constructing and maintaining expensive highways. The outcome of the first section will probably decide the advisability of extending the scheme to other camps such as Boston Creek, Larder Lake, Skead Township, Munro, Fort Matachewan and West Shining Tree.

Note:—Our readers will recollect that the use of ligt railways in the mining districts of Northern Ontario was first mooted by the Journal in its editorial columns (see issue 9th July 1919.)

An extensive development scheme will be undertaken on the properties of Gold Centre Mines, Ltd. in the Porcupine district in accordance with a report by B. M. Walton, M.E. to the secretary of the Company, M. P. Van der Voort of Toronto. The engineer says, that the property is exceptionally well located, adjoining the Hollinger Consolidated Gold Mines and that the mineralized area of the claims is large and the veins strong. The property, he declares, with serious development will amply justify the expenditure of a considerable amount of money with favorable chances of developing into a producing and paying mine. The report recommends the proving of the property by diamond drilling to a depth of about 5,000 feet and adds "I am convinced that this area alone would indicate a mine of large size and immense possibilities. Should the diamond drill holes along the contact prove the existence of commercial ore bodies, it would then be reasonable to assume that the entire line of contact will extend clear across the property running northeast by southwest for a distance of over 3,000 feet in length and would mean the probable existence of a very large mine which would compare favorably with some of the largest producing and dividend paying mines in the camp."

Action has been commenced in Toronto by Frank Samuels of Philadelphia against the Black Lake Asbestos and Chrome Company, claiming $80,147 damages for alleged failure to supply 2,685 gross tons of chrome ore, which, according to plaintiff, was the undelivered balance of the ore called for in a contract The defense claims the contract was conditional on being able to produce the ore, to obtain cars to transport it and on the Government placing no restrictions on export.

The American Society of Mechanical Engineers, Ontario Section held their first meeting for the season on the evening of November 14th in Toronto. The gathering took the form of a dinner at the Engineers' Club, following which General C. H. Mitchell, C.B., M.G., D.S.O., spoke on some phases of mechanical engineering in the war, which had come under his observation in France and Italy. General Mitchell, who went over with the First Contingent in 1914 as Intelligence Officer, served with great distinction, first in France and then as Intelligence Officer on the general staff of the British expedition sent to the aid of the Italians on the Piave. His address covered transportation matters and mobile shops and other engineering features of the advanced areas in France. He

made some very interesting observations on Italian hydro-electric developments as he found them at the end of the war in comparison with their condition and size at the time of a previous trip in 1906. He gave a vivid description of the Italian engineering feats in the construction of the "Teleferrica" or wire cable-ways which transported men and munitions in hanging carriers over mountain peaks and across great chasms, even when subject to a great hazard due to shell fire.

General Mitchell, who is the new Dean of Engineering, as well as an old graduate of the Faculty of Applied Science, University of Toronto, closed with a description of after-the-war conditions at the University and drew some deductions as to the trend of engineering opportunities in different channels, as indicated by the tendency of certain branches, notably mechanical engineering and engineering chemistry, to push ahead at the present time.

After the General's address the meeting proceeded to discuss plans for the season's work and the program of one meeting per month, alternately with a dinner with an address and a technical session, was decided upon. A large number of prospective members were present and all mechanical engineers of the district are invited to participate in these meetings, with the hope that they will ultimately join. It is felt that when members come from as far away as Chatham, London and Belleville to attend, there is little excuse for local engineers failing to identify themselves with the parent organization of this branch of engineering. Notice of the next meeting will be published in a later issue of this journal.

WASAPIKA CONSOLIDATED.

The successful development of the Ribble vein on the Wasapika Gold Mines property in the Shining-tree district has naturally directed attention to the properties north and south of it, for the Ribble vein is known to cross the north boundary and outcrops of similar ore and rocks have been found on several claims to the south. Owing to the heavy soil cover the vein is not easily followed on the properties south of Wasapika, but has been uncovered for a few hundred feet on the claim immediately north. The development of this northern property is provided for in a consolidation scheme recently approved by the directors.

Under the terms of the merger the Wasapika company will acquire three valuable claims. The owners of these claims will receive one-sixth of the shares of the consolidated company while the Wasapika owners will receive one-half of the shares, and the remaining third will remain in the treasury until required for development work and plant.

In addition to acquiring property of great speculative value the Wasapika company will gain access to the water, as the northern claims border Lake Michikawakenda. There are several good buildings on one claim, providing the necessary housing for all the present employees of the Wasapika company. The northern claims fortunately escaped the disastrous forest fires of last summer and will provide all the necessary mine timber, lumber and fire wood for some years.

The directors of the Wasapika company and the owners of the three northern claims have agreed on the consolidation scheme. A meeting of shareholders will be held on Dec. 2 and it is expected that they will approve.

Development work at the Wasapika property is steadily proceeding, attention for the present being directed to the deepening of the shaft. Manager Rogers wants to obtain as soon as possible some idea of the nature of the ore deposit at 200 and 300 ft. It is probable that the 300 ft. level will be chosen for extensive lateral exploration.

The company has under consideration the building of a 150-ton mill. It is probable that construction of the necessary buildings and installation of the machinery will not be long delayed.

To the Editor of the Canadian Mining Journal,
Sir,

THE FUEL QUESTION IN EASTERN CANADA.

The Eastern Provinces of Canada, including Ontario, owe the Hon. James Domville thanks for his masterly exposition, delivered lately in the Senate of the present parlous condition of their present fuel supply.

Those who are sufficiently interested and desire to study this so important question should read the Senator's speech.

The object of this letter is to create an interest in the minds of those who consider the welfare of the industrial workers as to the possibilities of heating the houses occupied by such workers and their families with oil fuel. The advantages that would accrue from the use of such fuel are herein plainly stated. The present and probable future cost of hard coal is a very serious financial consideration to the industrial worker, who, as a rule, has to pay higher prices than the users because he is compelled to purchase in smaller quantities and has to take delivery during the months when coal sells at high prices.

Were it possible and economical to use a good grade of gas oil (one of the many grades of oil produced from crude oil by fracturation) and were such a quality of oil always obtainable, the industrial worker would be able to purchase his fuel requirements week by week, a proceeding that would result in economy and which would also be less burdensome to the family exchequer.

The economic possibilities of the use of gas oil for fuel for the heating of small houses has not, up to date, been appreciated, but now that the high cost of hard coal fuel has caused more attention to be given to the re-construction of old time ideas for small house heating (as is evidenced by the construction of the "pipless furnace"), it seems to be the ideal time to consider the use of this new fuel.

The B.T.U.s (British Thermal Units, the quantity indicating the relative heat values) contained in one pound of hard coal varies from 12,000 up to 14,000. This is for the actual coal and not for the rock too often delivered as coal. It is probable that the average quality of the hard coal delivered to the homes of the industrial workers will not average 12,000 B. T.U. But let it go at 12,000 B.T.U. It is admitted that

in a house furnace, as generally looked after and fired, the actual efficiency is very low and seldom exceeds 25 per cent.

In a publication of the U.S. Fuel Administration, it is claimed that the following losses occur:

Heat lost up the chiminey owing to improper draft regulations	40%
Heat lost through accumulation of soot	10%
Heat lost by radiation of heat when the furnace is located in the cellar	20%
Heat lost by removal of cinders and by the presence of the cinders	5%
Total loss	75%

When the heating of a small house is effected by the use of base burners, it is certain that the efficiency obtained is higher, as certain of the losses above mentioned are considerably reduced, but there are serious objections to the use of base burners with the smoke pipes passing through every room.

Be the losses what they may, it is certain that they are very heavy with the arrangements that are now in common use, and under the conditions that exist and under those conditions it is difficult to see how the losses can be lessened. But in houses that will have to be constructed in the future, more suitable conditions can be arranged for and at little and often no increased cost.

An oil fired furnaces scientifically designed should be able to secure an efficiency of over 80 per cent, but were but 50 per cent secured it would be double the efficiency of the present hot air or hot water furnace.

One pound of good quality of gas oil possesses 20,000 B.T.U's, as compared with average hard coal 12,000 B.T.U.s. At 25 per cent efficiency one pound of hard coal gives 3,000 B.T.U.s, whilst at 75 per cent efficiency gas oil gives 15,000 B.T.U.s, and at 50 per cent 10,000 B.T.U.s, so in one case one pound of oil gas will be as efficient as 5 pounds of hard coal, and in the other case as efficient as 3 1-3 pounds. To be conservative the value of 3 1-3 pounds will be taken.

The industrial classes pay from $12 to $16 per ton of 2,000 pounds for hard coal—say $14 for 2,000 pounds of 3,000 effective B.T.U.s, or $14 for 6,000,000 B.T.U.s.

A gallon of gas oil will weigh 8—6 pounds arid at 10,000 effective B.T.U.s will total 86.000 or 70 gallons will give slightly more effective B.T.U.s than will 2,000 pounds of coal.

Therefore, gas oil at 20 cents per Imperial gallon, will yield as many effective B.T.U.s as will one short ton of hard coal.

Were the oil bearing shales of the Maritime Provinces developed an extremely high quality of gas oil would be produced, and this oil could be retailed at about 15 cents per gallon, so that the eventual cost of this fuel would be at least 25 per cent less than that of hard coal, whilst the labor and cost of repairs would be immeasurably less.

The use of gas oil, as fuel, supplementing the pipeless furnace, and the pipeless furnace so perfected, would seem to solve the question of heating for houses occupied by the industrial worker.

It is time that a practical consideration of the housing question, as it affects the needs of the industrial workers, should be taken up. The work undertaken by a branch of the Commission of Conservation under Mr. Thos. Adams would appear to have resulted in farce, frills and fiasco. Engineers learn to put "garments according to the cloth available. Dreamers spirit the cloth in attempting to supply garments possessing unnecessary and too often undesirable "frills." What is wanted are comfortable and sanitary houses, without frills, built at the lowest possible first cost and liable to receive the smallest possible cost for up keep. Is it not time for the public to realize the immense account of time and money that is being wasted through the placing of Canada's housing affairs under the management of men, who understand neither the needs of the industrial workers, local construction conditions (which in a country so large as Canada must needs vary widely) nor the practical problems involved in the economical and low costing construction.

LOUIS SIMPSON.

172 O'Connor St., Ottawa.

Copies of the Senate Sheet, as long as the supply lasts, can be obtained by persons living in Eastern Canada by sending a request accompanied by a 2c stamp to pay postage.

PORT ARTHUR NOTES.

By J. J. O'CONNOR.

Twelve zinc claims in the Ozone Siding zinc area, hitherto owned by several different parties, have been consolidated under one ownership, headed by Dr. R. J. Manion, M.P., Fort William.

A new discovery of zinc has been made ten miles east of Ozone Siding. Full particulars of the new find have not reached the writer as yet. It is said to be of a most promising character. A number of claims have been staked, and the field is being thoroughly prospected.

About midway between Ozone Siding and the new zinc discovery, a ten foot vein of baryte has been uncovered, claims are being staked, and preliminary work being done on them.

Excellent shipping facilities are afforded all of the above properties, as they lie alongside the Canadian Pacific Railway, which at that point skirts the shore of Mazokama Bay, a deep water harbour, on Nepigon Bay, Lake Superior.

WANTED—A competent man with experience covering the principal departments of electrolytic copper refining. Must be prepared to go to Europe if necessary. State terms in application, also experience in design construction and operation, giving references. Mark envelope "Application" and address to W. J. Forrester, Imperial Bank Chambers, Leader Lane, Toronto.

Showing position when dumping at the side.

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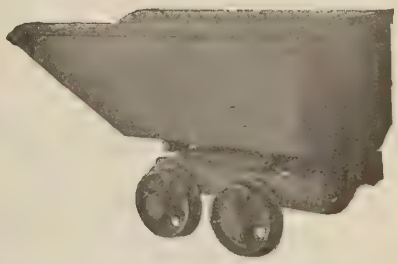
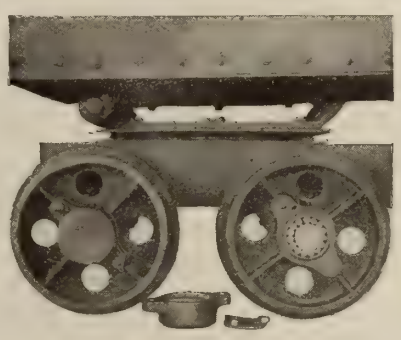


Showing car closed and ready for loading.



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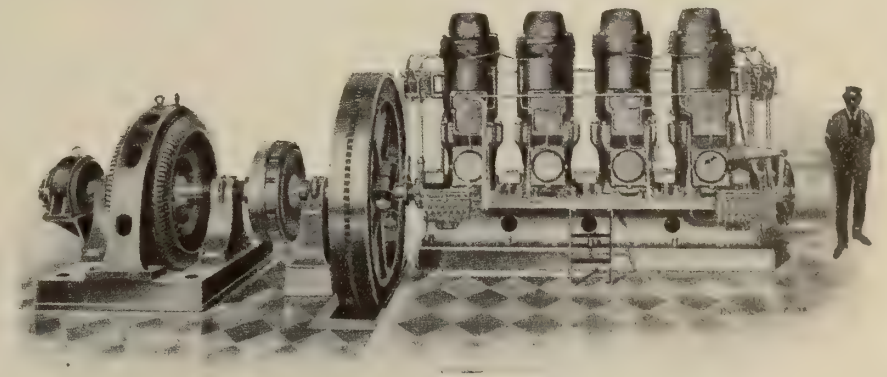

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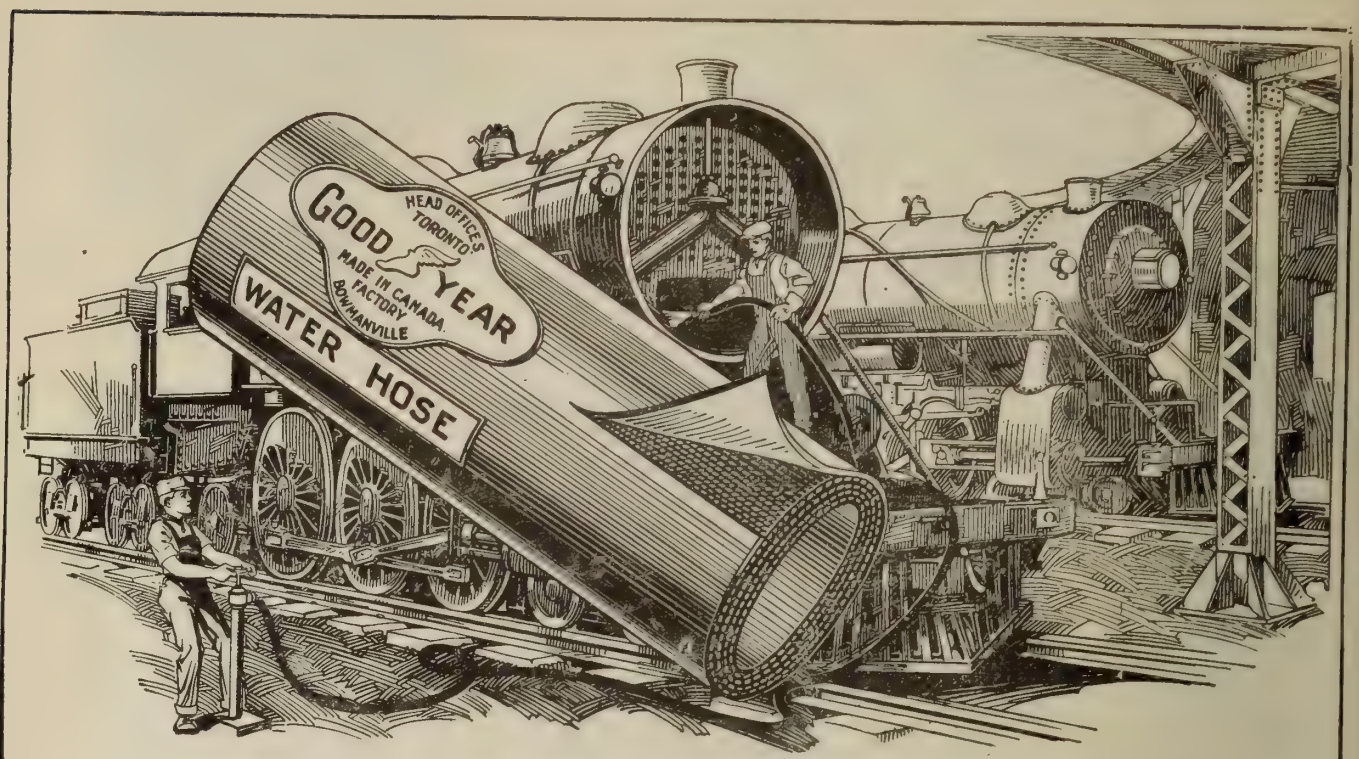

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EDITORIAL

A Graphical Summary of the Chronology and Progress of Canadian Mining

(By the Editor.)

Most essays and articles are illustrated after they are written, and pictures or diagrams are used, as the term signifies, for the purpose of throwing additional light on the subject discussed, but in the present instance, the graphs which are herewith reproduced were drawn first, and they constitute the main purpose of this article, which is, indeed, but comment suggested by the tendencies disclosed by the graphs. They are compiled from the statistics of the Division of Mineral Resources of the Mines Department at Ottawa, the value of which statistics we desire to acknowledge, together with the unfailing courtesy of its Chief, Mr. John McLeish.

Figure 1 shows the value of the mineral production of Canada over the last twenty years. The most striking disclosure of this graph is the predominance of Ontario. Quebec shows a gradual, but healthy, growth. The growing importance of Manitoba is reflected in the rise of the combined curve of the Prairie Provinces and the Yukon, but the scale is too large to show how Manitoba is making up for the falling off in the Yukon gold production. We venture to forecast that some day the value of the coal production of Alberta alone will exceed the value of the mineral production of any other single province of Canada, unless maybe it shall be British Columbia. The import of the concentration of the coal resources in the Province of Alberta is not by any means realized by the Canadian public. The combined curve of the Maritime Provinces is not, we believe likely to increase greatly, first, and chiefly of course, because of the comparative territorial smallness of these provinces, and, secondly, because the bulk of the value of their mineral production is derived from coal; and, in our

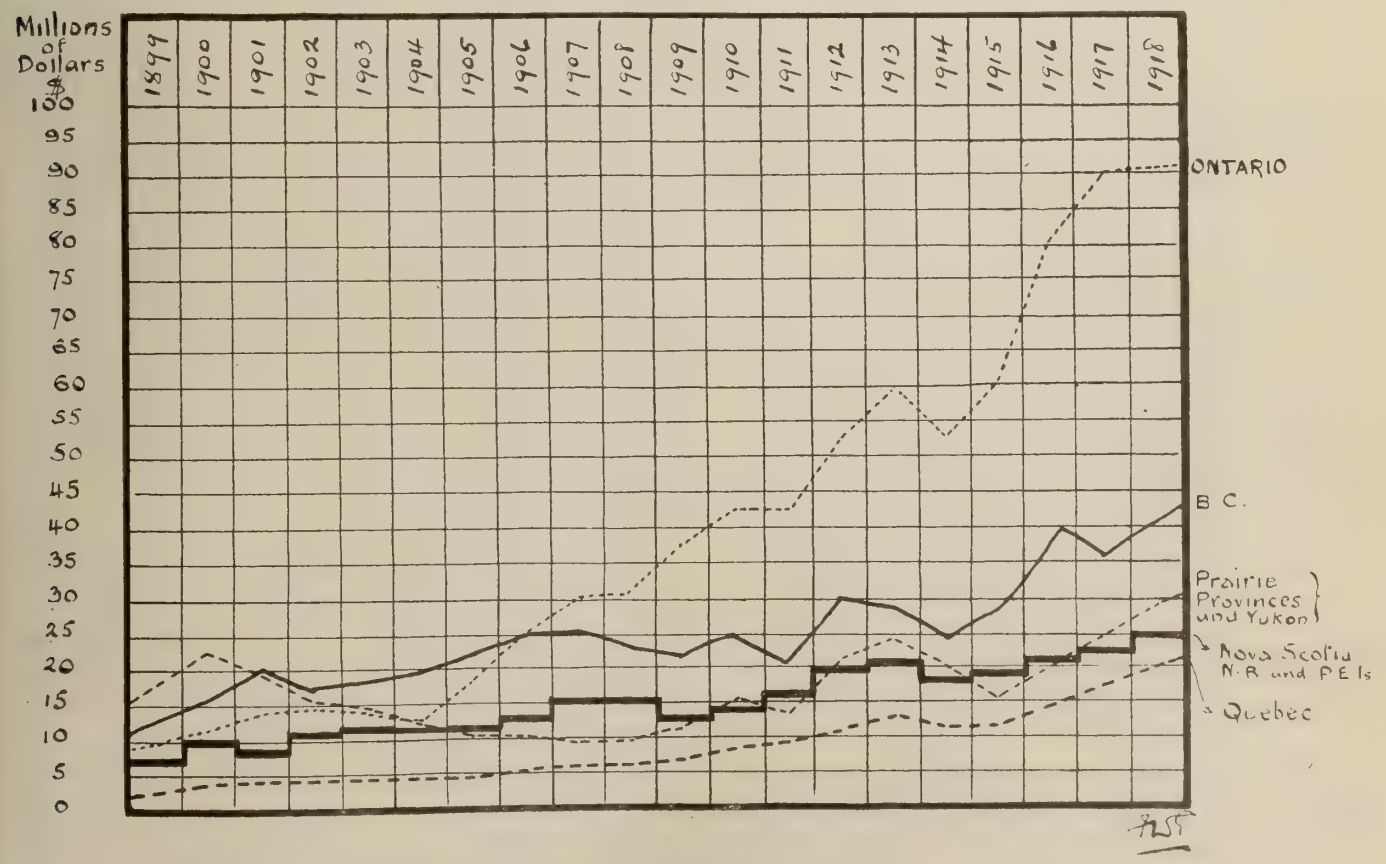

Fig. 1
Value of the Mineral Production of Canada over 20 years, by Provinces.

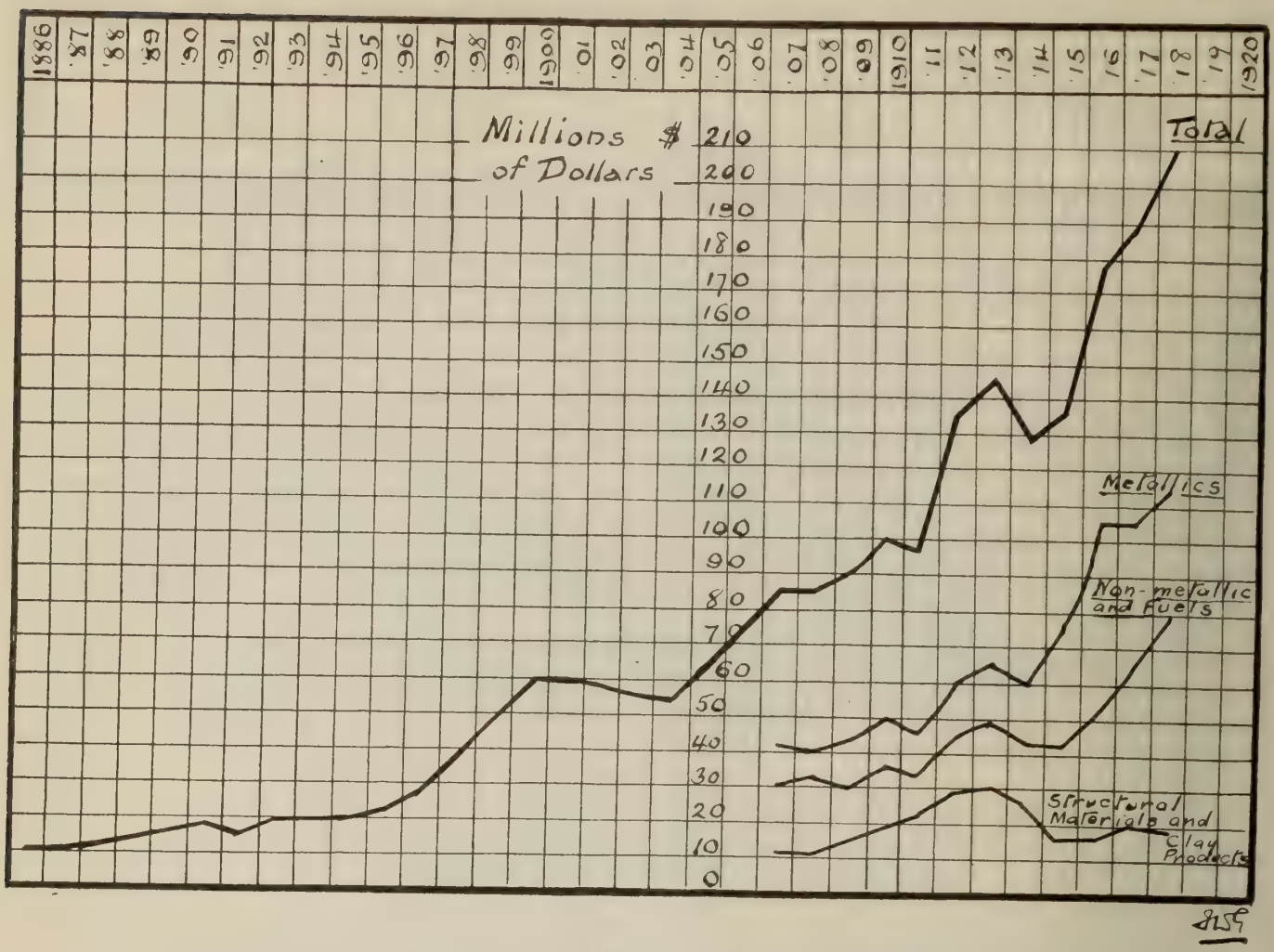

Fig. 2
Relative Value of Main Sub-divisions of Canadian Mineral Production.

opinion, the total annual production of coal from the Maritime Provinces is not likely ever to exceed ten million tons, which compares with an established maximum in 1913 of approximately 7½ million tons productive capacity.

Graph 2, shows the relative value of the main subdivisions of the mineral production of Canada employed in the Mines Branch statistics, which are only available in this form, in any completeness, since 1907.

The rising curve of the total value of mineral production is an impressive one, and visualises Canada's growth since the days of 1886, when Nova Scotia was the most important single contributor of mineral wealth, and that chiefly in the form of coal.

The effect of the war is well disclosed. The metallics—which include the bulk of the so-called "war minerals"—show the greatest advance from the low level of 1914, but, as will be observed from an inspection of Graph 3, the increase is more in monetary values than in weight of production.

In the non-metallics and fuels, the increase is also greatly due to the increased selling prices of coal, although it includes the effect of the increase in price in such war minerals as asbestos, chromite and magnesite.

The curve of the value of structural materials and clay products reflects the cessation in building activity which persisted right through the war period, and which still lingers in expectation of a coming decline in the costs of building materials—rather a vain hope we believe. Because of the high costs of building materials which have been manifest for a number of years past, the curve represents a smaller tonnage output than might at first sight appear to be indicated.

Graph 3 shows a selection of the more important minerals produced in Canada, the selection being purely arbitrary, and without significance, except as regards gross monetary values.

Coal shows up in its proper place as Canada's most important mineral asset, and a comparison between the curve of value, with its extraordinary jump since the year 1915, against the flat curve of actual tonnage production, will serve to emphasise, what is true of all the other minerals except gold, namely, a tremendous increase in unit values during the war period.

The curve of coal value has a far-reaching significance. There is no reasonable probability that coal will ever be mined more cheaply than it is today. That is to say, it may be mined at less apparent monetary cost when, and if, deflation should take place in gen-

eral commodity prices, but the expenditure in effort and the provision of the materials necessary to the extraction of coal, are outlays that must steadily increase, and the instrinsic value of coal will in the future become greater and greater from year to year as the available supply of the raw material is lessened, and as coal obtains a more and more extended use through the spread of the civilized arts to all quarters of the world.

Coal being the material on which all manufacturing costs are based, and a material which is moreover required to provide the power for the extraction of all other minerals, it follows that the curve of costs of most things must follow the curve of the cost, or market value of coal. As every indication forecasts a continuing increase in the selling price of coal, it seems fairly certain that a considerable proportion of the increased unit values of minerals is a permanent increase.

The high place occupied by nickel and copper production, and the declining curve of gold and silver values, will surprise a good many people who hear more of Cobalt and Porcupine than they do of Sudbury and Trail.

The curves display in an interesting way the chronology of Canadian mining. The Klondyke boom shows in the gold curve in the peak of 1900, four years after the discovery in 1896. The result of the discovery of the Cobalt silver veins in 1903 shows in the curve about 1905, rising rapidly to the large and sustained production of the period from 1910 to the outbreak of the war, when adverse influences affected both the market for silver and producing operations. The position of the silver curve in 1918 does not of course reflect the unpredented price of silver today, which in

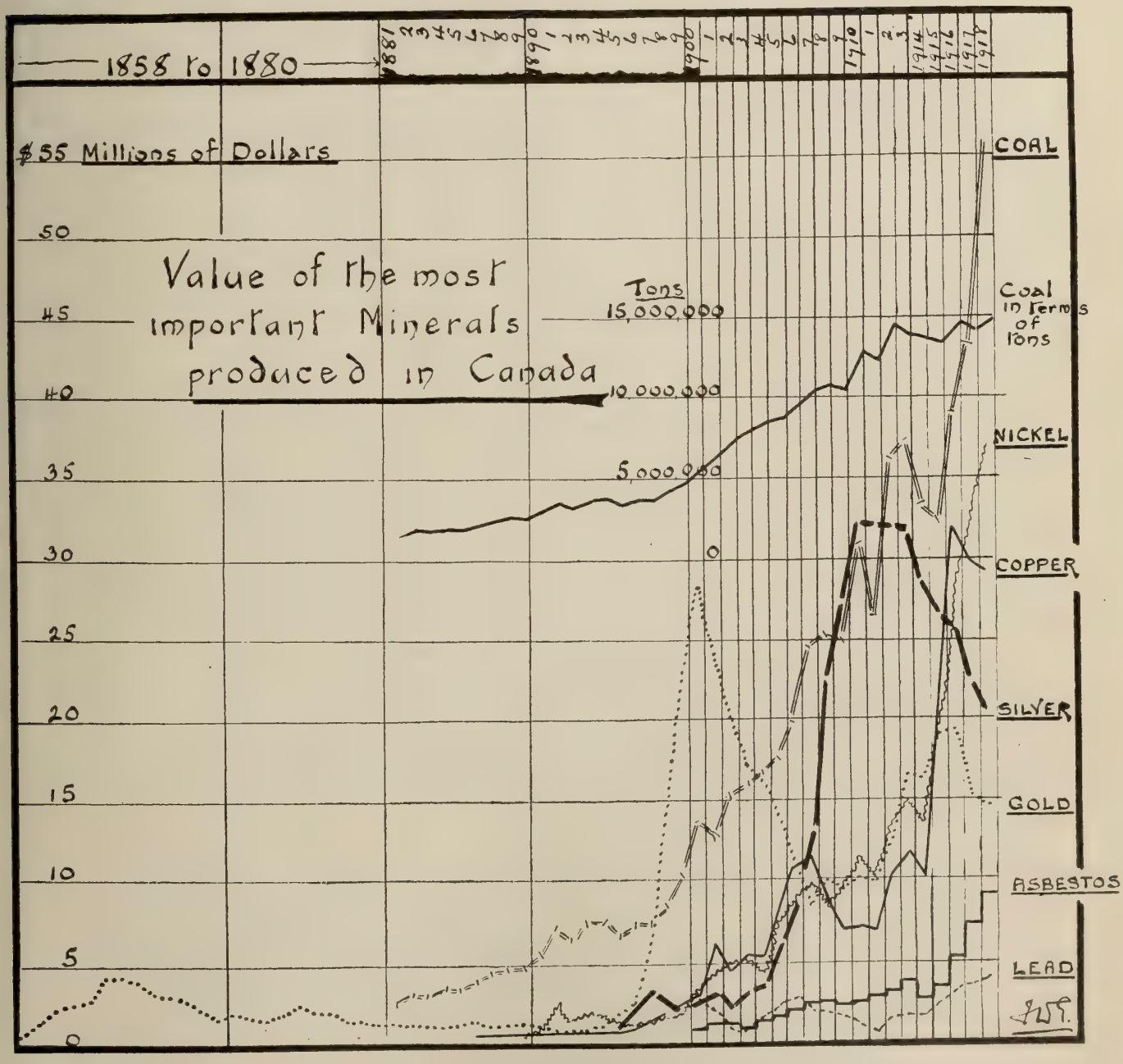

Fig. 3

the course of the year 1919, will to some extent offset the drawbacks to production that took place from various causes.

Copper, lead and asbestos all show the stimulus of war demand, while gold shows the effect of high costs of production and shortage of labor, combined with a fixed selling value for the product.

Iron ore is not shown in Graph 3, as its relative money value is small, and the production is stationary, or declining.

A previous article in the "Journal" (see page 606, issue of 13th August, 1919) contained graphs which showed in some detail the production and consumption in Canada, and the imports and exports into and from Canada, of iron-ore, iron and steel, coal and coke.

Those who are more familiar with the mining history of Canada than it is the writer's privilege to be, may recall many interesting things which the curves will suggest, which are not mentioned in this comment.

The graphs are published because they seem to form a convenient and easily comprehended summary of the chronology and unremitting progress of Canada's premier industry, and because they illustrate the value and wide scope of the work of compilation and recording which has been slowly built up in the Department of Mineral Resources and Statistics at Ottawa, without which the preparation of the accompanying graphs would have been a practical impossibility.

One general impression is conveyed by a study of the graphs, which it is not easy to express. It is perhaps a necessary concomitant of the early development of a highly mineralized continental area, not half prospected, that the curves suggest a certain fortuitousness in mineral discovery, or the chance uncovering of some of the mineral treasures of Canada. Possibly, Canada is now entering upon a period when mineral discovery will be of a more systematic and consistent nature, and when the curves will fluctuate only between small limits, but at high levels on the chart.

SAFETY WORK AT CALUMET AND ARIZONA MINES.

(By C. L. Colburn.)

The Calumet and Arizona Mining Company has established an efficient and progressive Department of Safety under the directions of Thomas Cowperthwaite, safety engineer. The Safety Department serves not only the Calumet and Arizona properties, but also associated companies; namely, the Calumet and Arizona smelter at Douglas, Arizona; New Cornelia Copper Co., at Ajo, Arizona; Warren-Bisbee railroad running between Warren and Bisbee; the Tucson-Cornelia and Gila Bend railroad running between Gila and Ajo. During November 1918, the Gadsden Copper Company at Jerome, Arizona, started development work and this also was taken in charge by the same safety department.

The Calumet and Arizona Mining Co., operates four large mines at Bisbee, employing about 1500 men underground and about 500 surface men during normal times. The smelter at Douglas employs about 800 men. The New Cornelia Copper Co., employs from 1000 to 1200 men during normal times and the Gadsden about 50

The safety system requires that all superintendents, foremen, shift bosses and others who have charge of men to be members of the safety committee. This is done for two reasons; first because the man who has charge of a piece of work should make observations regarding the conditions under which his men work, and should compel his men to exercise a reasonable amount of care, second it invites competition between those who have charge of men. The mines at Bisbee, the smelter at Douglas and the New Cornelia are always in competition with each other in safety matters. Their safety status is determined by figuring the yearly cost of accidents as compared to the pay roll. This method invites competition between the various superintendents who in turn require their foremen and shift bosses to use extra precautions to reduce their accidents to a minimum. At the New Cornelia copper mine, a committee composed of the heads of the various departments makes a trip around the plant and mine each month and reports the defects noted. This has proved very effective because each department head tries to find something wrong about his neighbor's department. All defects are reported to the Chief Inspector who investigates them and reports to the General Superintendent.

A bonus of $30 is paid to the boss whose gang works 2500 shifts without an accident requiring an employee to lay off. If a boss has 50 men he is credited with 50 shifts each day, therefore, it would take him 50 days to earn the bonus. A bonus of $100 is paid to the foreman who has the best yearly record. These bonuses have considerable influence in strengthening the competitive system. Each department head works to get better results than his colleagues. The Mining Department pays the following bonus to the men: any man employed who works one year without losing more than 30 days (except loss of time owing to serious sickness) receives a bonus of $100 for the first year. The second year he receives $110, the third year $120, and soon until the bonus amounts to $250. This is the largest amount paid.—Monthly Report of U. S. Bureau of Mines.

Mr. H. H. Sutherland, who has been critically ill in London, England, is reported to be much improved. A serious operation was necessary and there was doubt whether he would pull through, but he is now recovering rapidly. Mr. F. C. Sutherland is now with him.

Metachewan.

Diamond drilling is now in progress at the Matachewan gold mine and it is expected that vigorous development of the property will be carried on this winter. Plans are being made for the development of water power at Indian Chute on the Montreal River. It will probably be a year before this power is available for use. A very great reduction in power cost is expected and this should materially assist in the development of the Matachewan area.

Roof Control in Coal Mines

By JAMES ASHWORTH.

This subject is one of the most important of the large number of safety problems which have to be faced and vanquished by every colliery Engineer, Manager and official, and is moreover a most important matter of their daily work. On opening up a new coal mine the operators and engineers have to decide on what, in their opinion, will be the safest and most economical system for operating and extracting the largest per centage of the coal seam or seams. To arrive at this decision many things have to be taken into consideration, for instance, there may be a heavy overburden which means a huge pressure per superficial foot; (2), the overlying strata may be either very hard medium or very friable, particularly as regards the nether roof; (3) the floor also may be either favourable or unfavourable; (4), the seam may be abnormally thick; (5), its gaseous nature may be abnormal; (6), its faultings may require special attention, and lastly, it will be necessary to decide whether the coal shall be worked on the long-wall system or the pillar and stall or some modification of those systems.

In British Columbia the subject of Roof Control has not received as much notice as the subject deserves, and consequently great losses of valuable fuel have resulted. In some parts of the world careful records are kept of the tonnage of coal produced from any given area. Thus, supposing that an operator pays a royalty on the number of tons he extracts and sells, without any restrictions on his mode of extraction, he may through careless mining abandon large areas of pillars, but if on the other hand he is forced by the terms of his lease to pay for all the coal in the area under his holding at the rate of so much per foot thick per acre, then it will manifestly be to his advantage to extract every possible ton of saleable coal, and thus reduce his royalty charge to its lowest practicable amount.

"Roof Control" is a term which has been most generally used in connection with the long wall system of working coal, and in some districts especially in Great Britain has become so precise in its operation as to cause the roof to break with absolute regularity. Thus, the dirt and rock packs or walls in the goaves which mainly support the roof, also squeeze down with absolute regularity, and thus cause the roof pressure on the working coal face to be just sufficient to make the coal work and break down without any excessive crushing. In most of such cases the roadways are maintained by taking down part of the nether roof and using the material thus obtained to build pack walls which in time are crushed and become nearly as solid as the original strata.

Any system which is designed to produce this final result demands that as little as possible of the timber which has been used for the temporary support of the roof shall be allowed to remain in the goaves. Such systems therefore tend to save excessive costs in prop wood and chocks. Wherever any long wall system of working coal is put into operation for the first time, there is always a great tendency to leave timber in goaves to support the roof, whereas the real benefit to be derived from it is obtained by allowing the roof to break down or bend, and get into close contact with the floor in regular sequence. In a gaseous or fiery coal mine the long wall system of working will always give the safest results, because gas given off from the floor finds an easy escape over a large area, and avoids those dangerous localised outbreaks which are too frequently a feature of its escape in the limited area of the rooms of the pillar and stall system. The long wall system also assists in drawing gas out of the coal through the break in the roof which occur in advance of the working face. (see sketch Fig I).

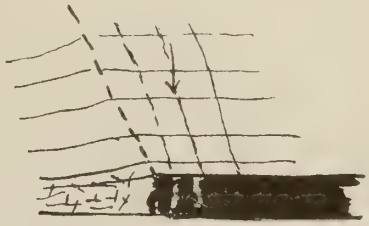

Fig. I

Roof Breaking in Advance of the Working Face.

Many carefully thought out papers have been written on the subject of roof control, and from at least one of these the writer proposes to make some apposite quotations.

"Quotations from authorities on Roof Control.

The author of most of the following quotations is Mr. H. W. G. Halbaum, who is well known through his connection with the Universal Mining School of Cardiff, Wales, and who in 1904 won the prize offered to the Institute of Mining Engineers by Mr. C. H. Claghorne. This paper was entitled "The Action, Influence and Control of the Roof in Longwall workings": and was published in Vol. xxvii. p. 205 1904. This was followed by a second paper on "The Great Planes of Strain in the Absolute Roof of Mines" (Vol. 30 p. 175-201), 1905-1906, from which the following notes have been taken.

"Have the forces which caused the thrust planes of Scotland absolutely ceased to exist? Have the forces which produced the cleavage plains in the coal seams of Northumberland and Durham left the strata in a state of high compression or not? Is resilence a property or not?.....The writer cannot but believe that the relief of high compression in mining strata provides a reservoir of horzontal force sufficient to impart the obliquity of the ascending line of strain.....

The case of "creep" is homely, but suggestive. If there is no real horizontal force, creep is an effect without a cause.....

The "creep" therefore is due to the true lateral extension of the strata beneath the under draw, Fig 2, and this lateral extension is due, evidently not so much to the vertical force transmitted through the coal stratum as to the pre-disposition (induced by super compression in situ), of the strata to extend themselves in the horizontal plane". You cannot break rock with a hammer whose head is formed with coal, neither

*Mining Engineer, Livingstone, Alberta.

can you transmit crushing stresses to rock through a coal medium enjoying lateral freedom..... To recognise a horizontal motive force, therefore is merely to recognise a difference of horizontal resistance.....

The relative draw extends from one eighth to two thirteenths of the depth of the surface.

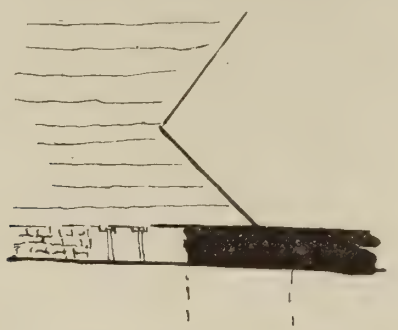

Fig. 2.
The "Under Draw".

Page 108 Vol. 30 Halbaum. Improbable Verticality of the Elementary Line.

"Consideration of the weight of strata overhead and of the strength of pit timber shows that mines must always be largely dependent on side thrust for the main support of the absolute roof, and this efficient side thrust can only be generated when the great lines of strain and principal fracture make an angle with the vertical. No one really believes that any wooden prop or any system of timbering can sustain either the dead or the live load—of the absolute roof. The office of the timber is merely to conserve the comparative integrity of the nether roof, and its efficiency is established when it performs this office successfully. The great lines of strain in the absolute roof are deflected from the vertical by angles which throw the bulk of the weight either back on the packs and dead strata or forward against the face of the prime strata. But if from any abnormal cause, they swing into the vertical line, the results are vertical slips of strata which may either smother the face of work, or superinduce those violent, though happily rare phenomena known as "bumps", outbursts of coal, liberation of large volumes of gas, with possible explosions of firedamp and wholesale destruction of life, limb and property. Such slips are strong presumptive evidence that the normal elementary line is not a vertical line. A vertical elementary line is an abnormal line, and produces abnormal phenomena.

Page 184,—mining engineers commonly say that the roof "arches itself". Fig. 3. An old road used as a return airway will arch itself, whether it runs in the direction of the working or at right angles thereto. Why? Because the roof of the road is a bridge across the road; a beam supported at both ends. Below the neutral surface, all the strains in the strata are tensile, above, all are in compression. When the bridge collapses, the roof arches itself.

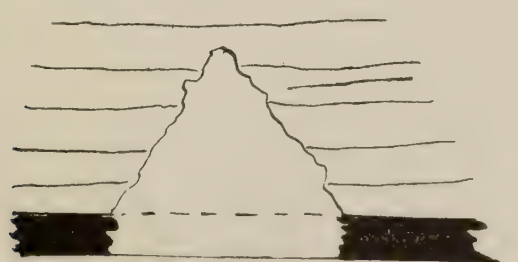

Fig. 3.
Roof Arching.

Page 185,—The arching of the nether roof is a very superficial process. The evidence for the great horizontal motive force which deflects the action of the absolute roof must be sought in the study of more massive phenomena.

Page 187,—And so the repetitive phenomena proceed to the very surface, each succeeding stratum, whether stable or unstable, propagating its strains further toward the solid than did the stratum below, and each, as it gives way, continually enlarging the area of subsidence. Thus the whole volume of subsided material finally assumes the approximate shape of an inverted conic frustrum, Fig. 4.

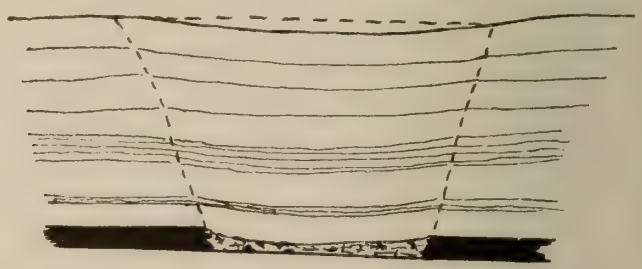

Fig. 4.
Showing upward propagation of subsidence strains.

Page 187,—The Cantilever Idea and its Corollary,—The conception of an ascending line of strain projecting over and towards the solid has been said to be incompatible with the idea of a cantilever action of the roof strata.....A cantilever possesses a neutral surface and above it all the stresses in the beam of strata are of the compressive order. The uppermost tensile stress and the lowermost compressive stress are the maxim of their respective orders; and both orders of stress regularly diminish as the planes on which they act approach nearer the neutral surface, at which plane both kinds of stress are reduced to zero."....When the roof of a road collapses, the roof arches itself and the wider parts of the arch occur where the tensile stresses are greatest.....The greater the stress is any given plane the greater will be the distance through which the resultant strain is propagated towards the solid." Thus in the cantilever of roof-strata, seeing that the maximum compressive stress obtains in the roof line, the strain in the immediate roof stratum must be propagated further towads the solid than the strain in the stratum next above will be propagated.... The compressive stress in the third stratum is again less than in the second, and the strain is propagated to a distance which falls short of that obtaining in the strata below; and so on until we arrive at the neutral surface where stress and strain vanish.

At the terrestrial surface we find the maximum probagation of tensile strain along the line of the draw and that the upper roof arches itself in obedience to the differential tensile stresses in the cantilever, but the arch is now an inverted one." Fig 5..

In all probability, the compressive component with its opposite obliquity is confined to the first few feet of, or above the roof stratum. The fact that it exists at all explains why careful timbering is requisite for

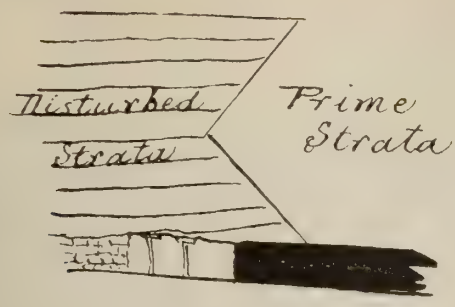

Fig. 5.

safety, and the exceeding superficiality of its extension explains why such timbering is sufficient to ensure safety."

Page 194,—So called good roofs, sandstones more than others perhaps, are peculiarly liable to those instantaneous reversals of stress which accompany any shift of the neutral surface; and this is so by reason of the peculiarly immense disparity of the respective resistances offered to tension and compression by any cantilever associated with an absolute roof the lower layers of which are chiefly furnished with a strong sandstone strata, or by other strata of similar nature.

Mr. Halbaum when writing the paper just referred to said that the first paper he wrote (his prize Paper), on The Action, Influence and Control of the Roof in Longwall Workings, (Inst.of Mining Engineers Vol. XXVII, 1904) would be better if read in the reverse order and therefore the quotations are in this order.

"The roof of a coal mine exerts two pressures. The first is a vertical pressure and due to gravity, and the second is a horizontal line of pressure due to the lateral compression of the rocks.

The influence of the roof on the coal to be gotten is to make the latter easier to be gotten.

In the bored and pillar system the action of the roof is more nearly allied to that of a simple weight,—in longwall it is more nearly allied to the action of a powerful lever,—we may bend the lever or we may snap it at its fulcrum.

Mysterious accidents due to falls of roof stratum sometimes occur under an apparently good roof. If we assume that the examination took place in the interval between the action of two stresses of opposite kinds the mystery disappears. We should therefore trust no roof whatever but carefully timber all.

In working to the dip the lateral thrust of strata beyond the face line is resisted by all the weight of the strata behind; whilst in working to the rise the lateral thrust of the strata beyond the face line is not merely unrestricted but is in a very positive sense facilitated by the weight, which naturally tends to slide down hill and thus accentuates the draw at the surface and exerts a mangling action on the coal head such as cannot be obtained in working to the dip. On the other hand, the roof is more liable to break off at the face line at rise workings, unless the packs be kept well up to the face.

Working to the rise also involves a larger expenditure of timber than does working to the dip.

Coal is more easily worked by the miner when the direction of the workings is at right angles with the direction of the cleavage.

In some cases it is necessary to change the direction of the line of working. The thrust which produces the draw at the surface and "mangles" the coal below is greater in magnitude and richest in power when the direction of working is at right angles to the line of cleavage. The compression of the coal itself is greatest in the line at right angles to the cleavage, and the coal is thus more likely (on its own account), to burst out from the face in such circumstances. The planes of cleavage divide the coal into a number of vertical slices, which run parallel with the face line.

Most long wall men prefer if possible to advance their longwall workings directly across the cleavage.

With a straight face roof action may be unduly violent and then the stepped longwall may be adopted and has often proved effective where a straight face was a practical impossibility.

We may find a weapon of roof control not only in the direction of working but also in the rate of working.

It is necessary to keep pack walls well up to the face of the coal.

The most successful working of longwall demands a roof only moderately strong.

Props tapered or chamfered at the ends ought to be used so that the ends will fuzz up instead of breaking when exposed to roof weight."

"Bumps" in coal mines of Crows Nest Pass District.

This question of roof control has been brought most prominently before the notice of coal mine owners, officials, miners and the public of Western Canada through several disasters at the Coal Creek mines of the Crows Nest Pass Coal Co. Ltd. A short resume of these will serve as an introduction to the subject, and possibly lead to practical solution of the problem of how to work these mines with greater safety, and with the least loss of coal. The frequency of what are locally termed "bumps", have made these mines notorious. Their cause being mainly attributed to movements of the roof strata, caused by insufficiency in the size of the pillars in the workings, but they were not seriously considered until after several fatal accidents had occurred.

The first recorded bump was in June 1906, on the south side of Coal Creek in No. 4 East level of No. 2 mine, when the floor was lifted. The 2nd and 3rd occurred in the month of August 1906, between Nos. 1 and 2 West levels, affecting the roof, and gas was given off. The 4th occurred on the 3rd of January 1907, in a room 18 feet wide, between Nos. 3 and 4 West levels, where the pillars were 25 feet wide. This bump caused an emission of gas, and displaced a piece of timber which fell on the miner and killed him. The 5th, occurred on the 22nd of July 1907, when a miner who was taking a skip off a pillar was killed by a fall of roof and side. Again on the 9th of October, a miner was suffocated by a sudden outburst of gas in a room off No. 4 West level. On the 19th of June, of the following year, three men were killed in a room off No. 6 West level, when the floor lifted to within two feet of the roof, and also gave off much gas.

Dept. of Mines directs new system of panels.

This accident caused in Minister of Mines to take action, and in June 1908, the Coal Co. were asked for a plan of a proposed new panel system of working, in which the rooms were to be 25 feet wide, and the

pillars 45 feet, but before it could be put into operation, another and more extensive bump occurred, viz, on the 31st of July 1908, somewhere between the 3rd and 4th West levels and westwardly of the main haulage road which was driven on a north and south line. At the time of the bump a skip was being taken off the side of the air road on the west side of the haulage road pillar. Three men were killed and one other who was rescued alive also died afterwards from shock. The bodies of one man and two horses were not recovered. It is known that the floor lifted and large volumes of gas were given off. To what extent the roof fell is not known, but some of it did fall. In all previous cases the lifting of the floor was the main feature of the disturbance, with an outburst of gas. In this latter case 24 men were involved, and twenty of them survived through making use of the air in the compressed air pipes which thus kept them alive for seven hours. The 9th and last bump in this area is said to have occurred on the 29th of September 1908 the effect of which was not known.

Provincial Mineralogist detailed to investigate and report.

After the bump of July 31st 1908, the B. C. Minister of Mines sent up his Provincial Mineralogist to make a special investigation and report, which was rendered on the 18th of November 1908. In this report very drastic recommendations were made but were however agreed to by the General Manager of the Company, although it entailed the entire closure of all the workings south of No. 1 West level. This area was outlined on the plan in red ink and comprised an area of over 50 acres. Further it was agreed that if the bumps continued this prescribed area might be enlarged. No roadways were to be driven through it, and it was also agreed to leave a barrier pillar between any new workings in the virgin coal and the prescribed area. It was also clearly explained that these definite conditions were laid down so as to prevent the company's officials changing this policy.

In additions to these restrictions a plan for the future development of the mine (No. 2), by a so called retreating long wall system of panels was agreed to, and development to carry out this plan was commenced, but on a change of management occurring it was found that the scheme was impracticable and later was entirely abandoned.

The new management then commenced to develop the same seam of coal from the main No. 3 slope, on the advancing long wall system, and this plan was followed for some years without any bump or gas outburst troubles, until another change in the management occurred, and it was decided to return to the pillar and stall system with larger pillars than had heretofore been customary. The main reason for this change appears to have been that the management thought that the pillar and stall system would produce cheaper coal than the long-wall system. This larger pillar and stall system has continued until the explosion in No. 3 mine in April 1917 brought the extraction of this coal seam to a temporary standstill.

Bumps were not however confined to No. 2 mine, and in 1916 there were bumps in No. 1 East mine, which are said to have exceeded in extent and destructiveness every other manifestation which had preceded them, though fortunately with a minimum loss of human life. These incidents are shortly reported by the Chief Inspector of mines in the annual report of the British Columbian Minister of Mines for 1916, as follows:—

Report of the Chief Inspector of Mines.

"On the 7th of November 1916, a series of bumps occurrel in No. 1 East mine of the Coal Creek colliery which completely wrecked the inner portion of the mine and caused the death of one man.

These bumps occurred during the early morning when the repairing shift was at work. A rescue party was quickly organised and on entering the mine found that all the men had escaped excepting one. Whilst attempting to reach the place where this man was supposed to be, another bump occurred about 5-20 a. m. Further rescue operations were then suspended for 24 hours, but were resumed and continued until Monday afternoon the 13th when, about 6 o'clock another severe bumps occurred and the rescue party was withdrawn.

It appears that a bump occurred during the afternoon shift of the 7th slightly injuring a miner in No. 9 room off No. 14 East level. The fire boss then removed the men, but owing to a cave in No. 8 room a horse was left inside.

The bumps of the 8th principally affected No. 14 East level though they also affected No. 12 West. The night repair shift of the 7th-8th finding the place "uneasy" retired back along the level, and here ten of them, with two firebosses, were blocked in by caves of roof on either side of them. After three hours work they managed to scramble out leaving one man and one horse unaccounted for.

The effect on the mine was, that all of it, to the south of No. 10 East and West levels was badly caved, in 65 working stalls all the stoppings being blown out, air doors destroyed, and fan air doors were forced open, the ventilation reversed, and the air concussion effects are said to have been felt five miles away.

Less than 25% of the coal had been taken out by the room workings and no pillaring had been done. Another bump on the 13th of November, again destroyed all the ventilating doors, and caused a great upheaval of the floor of the main haulage way for several hundred feet in the region of No. 12 levels. After this bump the Chief Inspector of Mines prohibited any further mining inside of No. 10 West level, i. e. southwards from the west side of the mine to Nos. 16 & 17 room on the East level."

Report of Mr. G. S. Rice of U.S.A. Bureau of Mines

Shortly afterwards the Hon. Lorne Campbell, Minister of Mines, called in Mr. G. S. Rice, of the U. S. A. Bureau of Mines, to report and advise as to the cause of the bumps, and the precautions which were necessary to prevent a recurrence This report has now been issued, and the present Minister of Mines, the Hon. Wm. Sloan, has also issued a pamphlet entitled "Summary of Principal Findings in the Crows Nest Field Investigation".

This summary was issued in December 1919. and has reference to the "bumps" in the workings of No. 1 East Mine on the south side of Coal Creek, Fernie, and is based on Mr. G. S. Rice's report.

(To be continued).

Sulphur in Coal*

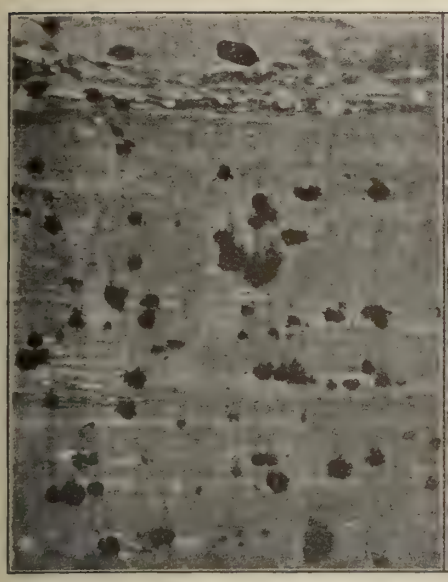

Fig. 1.

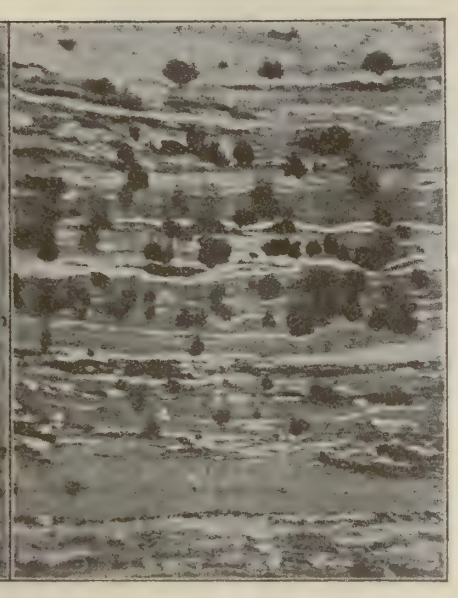

Fig. 2.

Fig. 1,—Thin cross section of coal from Vandalia mine No. 82, near Terre Haute, Ind., No. 5 bed, showing a thin layer of anthraxylous coal with numerous microscopic pyrite globules. Pyrite globules are shown black as irregular roughly rounded areas. Many have been partly broken and fragments, consisting of minute cubes, have been dragged to some distance over the section. Anthraxylon is that part of coal derived from parts of logs, stems, branches, or roots. × 100.

Fig. 2.—Thin cross-section of coal fromVandalia mine No. 82, near Terre Haute, Ind., from No. 5 bed, showing layer of dull coal containing numerous thin strips of anthraxylon embedded in an attritus or debris. Black, roughly round areas represent microscopic pyrite grains; white irregular strips represent cuticles; and short linear patches represent spores. Tendency of pyrite globules is to form rows along thin strips of anthraxylon. Attritus is that part of coal derived from all sorts of macerated plant parts and plant products. × 100.

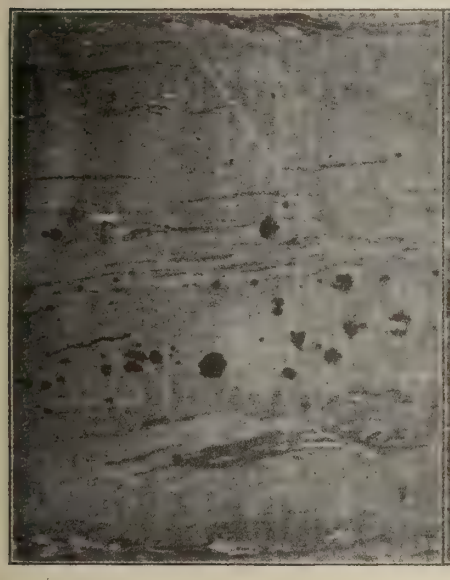

Fig. 3.

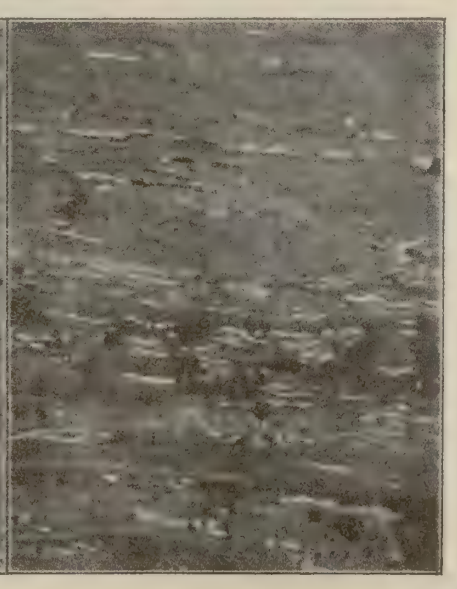

Fig. 4.

Fig. 3.—Thin cross-section of coal from La Salle, Ill., showing a layer of anthraxylous coal, including a number of pyrite globules. × 100.

Fig. 4.—Thin cross-section of coal from Sesser, Ill., No. 6 bed, showing pyrite globules in dull coal, which here is composed of thin strips of anthraxylon and attritus; the latter includes spores, shown white. × 100.

Reference was made in our editorial columns in the October issue to the very interesting symposium on sulphur in coal that took place at the Chicago meeting of the A. I. M. & M. E., and while a full reproduction of Dr. Reinhardt Thiessen's paper on this subject would probably not be desirable in a periodical that is prepared for persons who are more concerned in the uses of coal than with its origin or production, a condensation of Dr. Thiessen's treatise, with a reproduction of the microscopic sections on which his conclusions were mainly based, may be not improperly included.

Dr. Thiessen mentioned the better known, and grosser forms of sulphur occurrence in coal, in the form of balls, lenses, nodules, continuous layers, thin sheets and flakes occurring both in the horizontal planes and in the vertical cleavage fissures of coal as it lays in the seam. But pyrites also occur in very fine microscopic particles, disseminated or powdered throughout the compact coal. This form of pyrite occurrence has had little consideration.

All the coals examined by Dr. Thiessen contained a varying amount of sulphur in very small globules, or particles, of pyrite. Their minute size is best appreciated by comparing the illustrations accompanying, in which they are shown at a magnification of 100 diameters, which is equivalent to stating that the entire field covered by the individual slides represents actually a section of coal as large as the ordinary period used in print. The streaked appearance of the globules of pyrite is due to their breaking into innumerable cubical fragments in the process of cutting the section, which distorts the dots of pyrite to some extent.

The amount of pyrite in this form varies cconsiderably in different beds from which coals have been examined, and also in different samples from the same bed, or even in different parts of the same microscopic section. No coal section examined has been found did not contain pyrite particles, but no regularity of occurrence has been noticed.

The largest number of the pyrite globules is found in that part of the coal believed to be derived from the woody parts of plants.

Sulphur is an essential element in almost all proteins, which are essential to living organisms, and as coal is derived

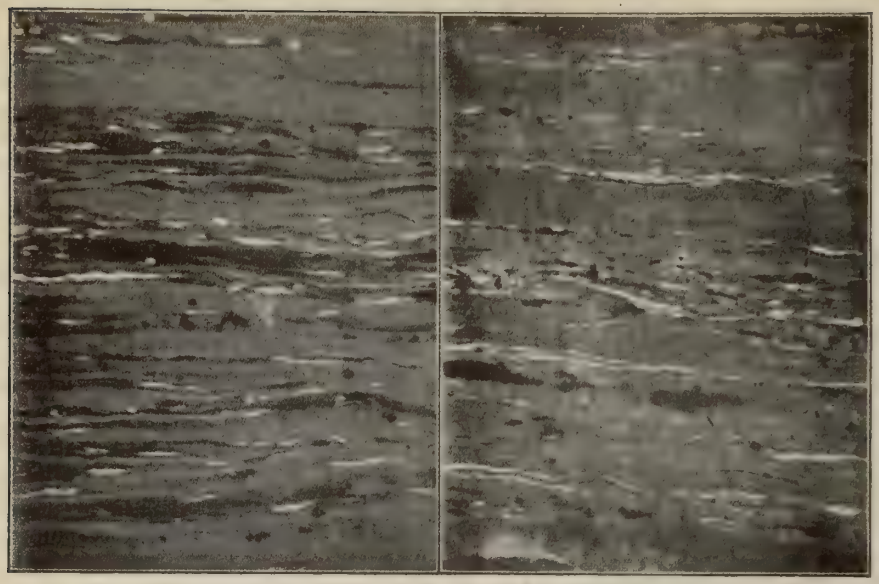

Fig. 5.

Fig. 6.

Fig. 5.—Thin cross-section of coal from Shelbyville, Shelby Co., Ill. Pyrite globules are distributed through whole section; here and there, several have joined and others have coalesced. Globules are somewhat smaller than in other sections shown. × 100.

Fig. 6.—Thin cross-section of coal from Sipsey mine of Black Creek bed, Ala. Some of pyrite globules have coalesced into lenticular masses, smaller globules are distributed through whole section. × 100.

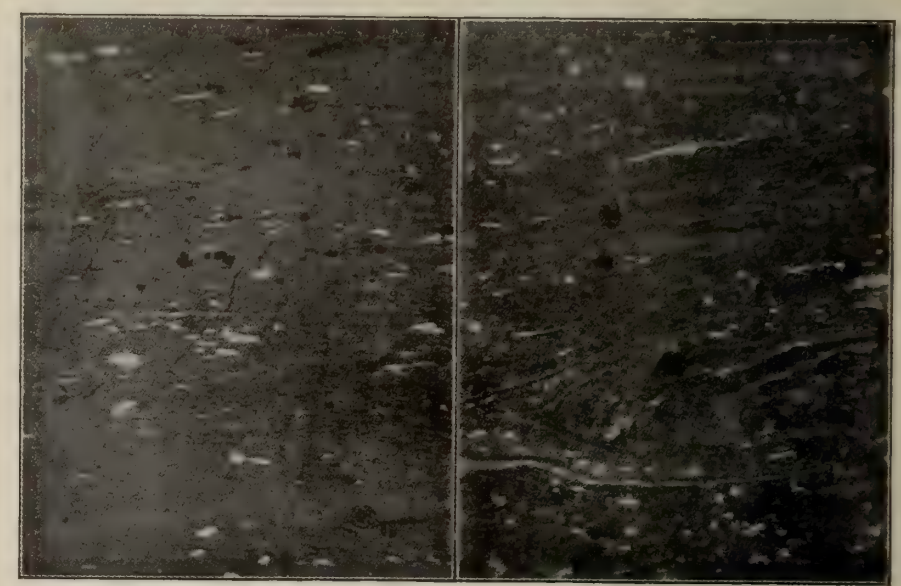

Fig. 7.

Fig. 8.

Fig. 7.—Thin cross-section of sub-bituminous coal from Stone Canyon, Contra Costa Co., Calif. Coal shown consists of rather finely macerated woody matter, including resinous particles and cuticles, besides pyrite globules, shown in black. × 100.

Fig. 8.—Thin cross-section of lignite from Montana. Section shown consists of macerated woody matter and other plant debris, including some spore and cuticular matter. Only two pyrite globules are shown. × 100.

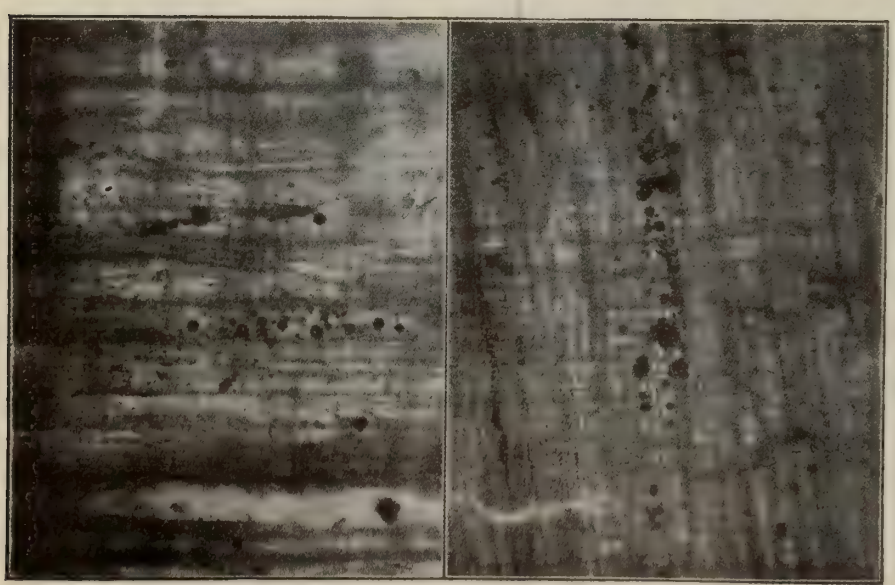

Fig. 9.

Fig. 10.

Fig. 9.—Thin section of woody peat, taken from peat bog near Hayton, Wis. Black dots represent pyrite globules lodged in wood fibers; several have been brokcn into minute cubical fragments. × 100.

Fig. 10.—Thin section of woody peat taken from peat bog near Hayton, Wis., showing considerable number of pyrite globules lodged in wood fibers. It will be noticed that they are strung out in cavities of wood fibers. × 10.

from vegetation, it must contain at least as much sulphur as the substances from which it has been formed. This form of sulphur is not microscopically distinguishable, and is usually referred to as organically combined sulphur. Regarding this form of sulphur Dr. Thiessen says it has received much scientific attention but has not been sufficiently recognised on the economic side.

Non-protein sulphur exists in plants, and is particularly large in quantity in such odoriferous plants as onion, garlic and mustard, while in some wood ashes it is found up to 3.7 per cent in the case of white pine. Dr. Thiessen notes that the amount of sulphur in plant ashes is not a true index of the quantity present in the plant material, as a certain amount escapes in the burning.

Sulphur is found in all peats, and the process of growth of new and living organisms in the peat bog on top of the residue of plant growth that preceded them, causes a concentration of sulphur in the peat, which is found to contain by actual trial from 0.29 to 4.21 of sulphur. If therefore in the conversion of peat to coal a reduction to one-tenth of the original mass is assumed to have taken place, with no loss of sulphur, then the resultant coal would contain from 2.9 to 42.1 per cent of sulphur. There is therefore more than enough sulphur in peat to account for all the sulphur in coal.

Dr. Thiessen makes more interesting speculations on the part which is played by sulphur bacteria in reducing sulphur to a form in which it can be used by plants, but his remarks are in this respect extremely technical, and moreover the knowledge of the chemical reactions caused by these bacterial organisms is not exactly known today, so that no exact analogy can be drawn with what may have occurred in the age of coal deposition.

Dr. Thiessen's reasoning bears entirely on the form of disseminated sulphur shown in the slides, which he assumes, for the reasons mentioned, to have had a primary origin, and is found in coal today because it is a prime constitutent of the vegetation from which coal is formed.

The grosser forms of sulphur, such as balls, lenses and the large sheets of marcasite that occur in some coals, may have a secondary origin.

Dr. Thiessen's paper would appear to suggest that the "sink and float" test of the sulphur carrying elements in coal, preliminary to installing washing devices for the reduction of sulphur, might be usefully supplemented by microscopic examination of the coal.

F. W. G.

*Abstracted from a paper by Dr. Reinhardt Thiessen on "Occurrence and Origin of Finely Disseminated Sulphur Compounds in Coal", published by permission of Dirctor, U. S. Bureau of Mines, and read before the A. I. M. & M. E. Chicago, Sept. 1919.

COBALT.

Cobalt minerals are rather uncommon except in the Cobalt district, Ontario, Canada, where they occur in ores that are worked for their silver content, the cobalt produced being a by-product. The smelting and refining of this ore has recently been described by Sydney B. Wright (Mining and Scientific Press, Jan, 25, 1919, p. 125.) As these ores are brought to various smelters, according to changes in smelting contracts, the material comes on the market from different places at different times. In the main it is marketed as cobalt oxide, the metal is produced from the oxide by reduction. The principal use of the metal is in the patented alloy known as stellite (about 80 per cent cobalt) which is used as a high-speed cutting tool in place of steel (Transactions A.I.M.E. Vol. 44, p. 573). It is also used in a high-speed tool steel which contains 4 per cent cobalt and 16 per cent tungsten. It is also claimed that it can be used as a substitute for nickel in plating, the rate of deposition being faster than with nickel and a thinner coating giving equal protection. Other uses of cobalt compounds are in the making of insect poisons and also for coloring pottery and glass, to which it imports the shade known as Delft blue, and also certain purple shades.

Official statistics give the output in Canada in 1916 as 841,859 pounds; of which 215,215 lbs. was in the form of metal. The oxide produced amounted to 670,760 lb., and there were smaller quantities of sulphate, carbonate, and hydroxide of cobalt. Up to the present time the supply of cobalt available from the Canadian ores has been abundant to meet all demands.

There are only two sources of cobalt in the United States that are of any importance. A deposit at Blackbird, Idaho, is owned by the Haynes Stellite Co., which has erected a plant for the production of cobalt concentrates. Cobalt, nickel, and copper sulphides occur in association with lead ores at Fredericktown, Mo., and some cobalt oxide is now being produced by the Missouri Cobalt Co. The price of cobalt metal has averaged about $2.00 per pound in the United States.—From Monthly Report of U. S. Bureau of Mines.

Personals.

Mr. J. B. Tyrrell of Toronto expects to return to the district early in December to complete his examination of the Gold Pan property.

Mr. J. B. Tyrrell and Mr. Jas. McEvoy represented the Toronto branch of the Canadian Mining Institute at a meeting of engineers in Toronto on Nov. 25, to discuss proposed legislation with reference to the engineering profession.

The field geologists of the Ontario Bureau of Mines have all returned to Toronto. Mr. P. E. Hopkins is working on a report on the Shiningtree gold area which will be published soon. A detailed report on the geology of the Kirkland lake area is being prepared by A. G. Burrows and Mr. Hopkins who spent most of the summer in that area.

Mr. J. B. Tyrrell and Mr. R. E. Hore of Toronto will leave shortly to examine gold mines in the Rice Lake district, Manitoba. Mr. Tyrrell will complete his examination of the Gold Pan which he visited just before the freeze up. Mr. Hore will examine the Brooklyn mine.

Ontario's new Minister of Mines, Hon. Frank Mills, will leave Toronto this week to visit the Northern Ontario mining centres. It is probable that Premier Drury and the Minister of Lands and Forests will also make the trip.

Special Correspondence

NORTHERN ONTARIO.

The Silver Camps.

An outstanding feature in connection with the silver mining industry of Northern Ontario, inclusive of Cobalt and Gowganda, is the continued high quotations for silver at a time when the cost of producing is declining. A few of the operators, but not a majority, in spite of the contentions of metal authorities that the price would continue to rise, semed to be of opinion that a decline in the cost of producing would be attended with a more or less corresponding decline in quotations for silver. A few years ago, under normal conditions, it cost, roughly, an average of about 25 cents an ounce to produce silver. At that time 55 cents an ounce was considered to be a fair average price for silver, leaving a net profit of about 30 cents for each ounce produced. Now, with costs more than double, having risen to about 55 cents an ounce, and with silver qouted at upwards of $1.25 an ounce, a net profit of 70 cents is being realized on each ounce produced. The margin of net profit, therefore, is considerably more than double that of a few years ago.

From the foregoing, it would not be well to conclude that the mines are realizing aggregate net profits more than double that of a few years ago. The fact is, that production is recording a natural decline and at the present time is averaging only a little over one million ounces a month as against over two million ounces monthly in the camp's most productive days. Thus, one favorable factor, the high price of silver, and one unfavorable factor, the natural decline in output, serve to about balance one another in such a way as to leave the total net profit as a result of current operations about equal to that obtaining in the camp's most prosperous days.

The negotiations between the controlling interests of the Buffalo Mines and the Mining Corporation of Canada, which has been referred to in these columns as any notable progress was made, has terminated successfully. The deal is a private one insomuch as it was between Charles L. Denison, of New York and the Mining Corporation. For the time being the Buffalo company remains as it is, with the exception that a complete change is being made in the directorate and the management. The writer learns on good authority of the probability of the entire Buffalo company being ultimately taken over, now that control has actually passed to the Mining Corporation.

The Northern Customs Concentrator Company has opened negotiations with the Chambers-Ferland Company with the object in view of purchasing that part of the latter company's property lying adjacent to the La Rose Consolidated. At the time of writing, negotiations have reached an interesting stage and the outcome will probably be learned within the week.

During October the Kerr Lake mine produced approximately 112,000 ounces of silver, thus setting the highest record for some months. The value of the month's output amounted to close to $134,000, and is at the rate of around $1,608,800 a year, as compared with the last fiscal year's output of $1,637,143.

Net profits being realized by the Northern Customs Company as a result of operations being carried on in the old Silver Cliff mine is stated to approximate $25,500 a month, according to official advice to the writer. The property is being worked under lease which includes from surface down to 500 feet in depth. Below that depth, the Silver Cliff is involved in a special arrangement with the adjoining National Mines.

At a depth of 750 feet on the Beaver Consolidated, some exceedingly spectacular ore is being encountered, the richer shoots containing ore carrying from 5000 to 10,000 ounces of silver to the ton.

At a number of the mines, workmen's committees are being formed, along the lines of the agreement between the employes and the mining companies at the time the recent labor strike ended. This leaves the Cobalt Miners' Union without authority, in that the arrangement is one strictly between the various companies and their own employes. The Kerr Lake is among the first to carry out the scheme. A committee has now been formed, composed entirely of Kerr Lake employes. This committee is encouraged to present to the management any grievance which any of the employes may entertain. In this way it is expected that no difficulty will be experienced in relation to matters of welfare for the men. Already the plan is stated to give excellent promise of the desired success.

Arrangements are being made to carry out a diamond drilling programme on the Adanac, in that part of the property lying adjacent to the Gans property of the Temiskaming. It is proposed to drill from a cross-cut at the 310-ft. level. In this part of the property the formation is entirely diabase and the exploration of that area is *not* in accordance with the recommendations of geologists. The reason for adopting this course is due to the success which the Temiskaming Company has met with in exploring the Gans lot. The work will commence as soon as a drilling machine can be procured.

The plan to construct light railways to the outlying mining camps is making satisfactory progress, according to late information. A new company has been incorporated, to be known as the Canadian Light Railway Construction Company, Limited, with a capitalization of $500,000. J. Roebuck, C. J. Corless and W. B. Jones, Toronto, are the incorporators. It is planned to commence actual work next spring.

From the details now available, it is learned that equipment originally purchased by the United States government for use behind the fighting lines in France is being secured. It consists of 30-pound rails, 39-inch gage, the motive power being supplied by 12-ton oil-burning steam engines. The project is one which appears to be quite feasible and may reasonably offer a solution of the transportation problem peculiar to the various outlying districts. In this it is considered probable that the government will offer every reasonable encouragement to those at the head of the new enterprise. Incidentally it seems to open a field in which the various governments may be able to turn much of their transport equipment to continued national good. Also, another factor, and a big one in the North, the success of such a scheme would tend to relieve the government of the burdens of constructing many truck or macadam roads and the attendant costly upkeep.

Regarding the Bailey-Cobalt litigation and the question of whether or not the offer of the Northern Customs Company will be accepted, the case was heard before Mr. Justice Sutherland at Osgoode Hall, on Nov. 19th, decision being reserved.

The winding up of the affairs of the old Majestic-Cobalt is being concluded, according to advice just to hand.

Regarding the question of organizing the Northern part of the province of Ontario so as to gain increased governmental recognition, arrangements are being made to get in touch with all centres in the north. A monster convention is being planned for the next month or so, it being stated among a number of leaders in the movement that the question of secession from Southern Ontario will be considered "a proper subject for discussion."

Gold Mining Districts.

The Hollinger Consolidated dividend payable December 2nd will call for the disbursement of some $246,000. It is expected to be followed by a similar disbursement four weeks later. As to whether or not the New Year will be marked by an increase in the dividend rate, considerable speculation is heard. However, those in more or less close touch with the directorate do not appear to anticipate any increase for a few months longer.

The McIntyre-Porcupine intends to carry out the recently proposed experiments in connection with mechanical muckers. Should this method prove satisfactory it will solve to some extent the present difficulty of securing unskilled labor.

At the Dome Mines considerable attention is being devoted to the development of the Dome Extension. Facilities have been provided whereby it will now be possible to treat a substantial tonnage of ore from the 600-ft. level of the Dome Extension. Apart from this the week appears to have not been marked with anything of more than usual interest at the Dome.

According to official advice, the Porcupine-Keora will be developed to a depth of 250 feet, and a contract for sinking will be let. The management is now engaged in procuring a mining plant, during the installation of which it is proposed to carry on work by hand. The camp buildings are being put in habitable condition. Regarding reports that a mill was to be installed, the deport is decidedly premature to say the least, in that the management plans some actual development work before taking such a step. The Keora is situated in the north part of the township of Whitney, in the Porcupine district.

Satisfactory progress is being made in the development of the Clifton-Porcupine, a considerable tonnage of commercial ore having been opened up. Ore is said to occur on several faces throughout the underground workings.

In connection with the Gold Reef, relative to the recent increase in capital from $1,000,000 to $3,000,000 for the purpose of making possible more aggressive work, nothing of a definite nature appears to have been announced with the exception that the increase in capitalization was ratified. As to the plans of financing and the work proposed, no official statement has been made.

In the Kirkland Lake field satisfactory progress continues, and the result of the first month of operation following the ending of the labor strike is being awaited.

Activity is gradually extending in an easterly direction from the known productive area, and the township of Lebel is coming in for increased attention. The geological conditions in that direction are favorable, and encourages the belief that important developments may be expected. A number of small operations are under way, and the reward so far has been quite promising.

The districts of Boston Creek, Skead township and Larder Lake continue active and the result of work is steadily adding to the potential value of these districts. With the arrival of good sleighing which will make transportation less difficult, work will take on increased proportions. This is also true of the Fort Matachewan gold area. In regard to Fort Matachewan, the diamond drill will be employed again this winter in further exploring the Matachewan Gold Mines (formerly the Otisses) as well as exploring the Robb-Clemens claims which were recently optioned to Smith and Norrington, both of whom are interested in the Allied Gold Mines of Boston Creek. It is stated officially to the writer, however, that the Allied Gold Mines is not involved in the present option on the Robb-Clemens property.

In a general way, interest in gold mining is increasing, and capital, attracted by an opportunity to participate in the development of such a promising mining area, is coming in with increasing volume from the United States and from abroad.

Seven cases are listed for the sittings of Mining Commissioner T. E. Godson, K.C., to be held in Haileybury, on Wednesday, Nov. 26. Following is a summary:—

Thomas Burns vs. John Walsh, being an appeal from the decision of the Mining Recorder in refusing to accept applications for restaked claims L-8065, 8064, formerly L-2515 and 2516.

D. D. Chisholm vs. D. H. Gardner, being a dispute in respect of claims GG. 4144 and GG. 4146.

A. Koury (Thomas Boursk) vs. Robert Fereguson, being a dispute respecting claim L. 7405.

W. H. O'Connell vs. R. R. Campbell which is an application under section 81 of the Mining Act of Ontario in respect of mining claims L-6784 and L-6785 (now L.S. 84 and 85).

Robert Bruce vs. D. D. Chisholm (Donald McDougall), being a dispute in respect of mining claim GG. 4203 situate in Nicol township in the Gowganda Mining Division.

Sandy McIntyre vs. C. E. Pimelle, being a dispute in respect of mining claims L-6872 and L-7295 situate in Lebel township in the Larder Lake Mining Division.

John Y. Cole vs. Donald B. Menzies, being application in respect of mining claim L-3660, L-3663 and L-3664 situate in the Larder Lake Mining Division.

During the week ended Nov. 21st, four Cobalt companies shipped an aggregate of 369,560 pounds of ore. The week's shipments were considerably below normal. Following is a summary:

Ore Shipments.

Shippers.	Cars.	Pounds.
Buffalo	1	109,290
McKinley-Darragh	1	105,659
Mining Corp.	1	92,611
Dominion Reduction	1	62,000
Totals	4	369,560

Bullion Shipments.

While ore shipments were low during the week, the shipments of bullion were comparatively heavy, the Nipissing sending out two consignments and the Mining Corporation one, the whole amounting to close to one-quarter of a million ounces. Following is a summary:

Shipper.	Bars.	Ounces.
Nipissing	132	176,839.58
Mining Corporation	73	72,808.89
Totals.	205	249,648.47

The combined value of the silver at present quotations and the value of the ore amounted to upwards of $350,000.

BRITISH COLUMBIA.

Salmon River, B. C.

On the Forty-Nine Property development is being continued energetically and is expected to be maintained throughout the winter. Mr. H. Howson, who is in charge, states that both the Occidental and the Forty-Nine Tunnels are being driven ahead, the former in shipping ore and the latter in a good concentrating grade. The Forty Nine Tunnel was driven as a crosscut to tap the vein and when the ore body was reached was continued as a drift. It is heading towards the high grade ore which shows on the outcrop. Mr. Howson says that, if the transportation facilities were available, the property could be shipping now. The camp is as comfortable as circumstances will permit being laid out and built on modern plans, with baths, hot and cold water, oil heaters; the best of food and a good cook also being provided. Besides there is a completely equipped assay office. As the first man went on the ground as late as the first of July last it is thought that a record of accomplishment has been made.

A large motorsled ore truck has arrived at Stewart B. C. for the Premier Gold Mining Company. This is expected to be the forerunner of a battery of the same, it being confidently anticipated that the truck will do the work for which she was purchased, namely, carry the ore over the winter trail from the mine to tidewater. It is likely that the new hauling device will be tried out about the middle of December, as the heavy snow, as a rule, does not come until about that time. It is the intention to install compressor machinery at the Mine and to put in power drills. An electric light plant has been installed and the bunk house, cook house, compressor building, and ore sorting shed are to be lighted by electricity. The wires will be carried to the mine entrance.

Other properties which, according to a definite statement, will be active this winter are the Big Missouri Mineral Hill, and Bush, while it is considered likely that the New Alaska will be developed to some extent. On the property of the Bush Mines, Limited, which is situated just the northeast of the Premier, work is underway under the superintendency of Mr. H. Tanner. The result to date are said to be encouraging. O. B. Bush, of this Company, and head of the Company formerly operating the Premier, has returned to Stewarts and intimates that an extensive programme of development has been decided upon.

On the Mineral Hill development is in charge of Mr. Al. Harris, the work being done on the Joker Claim. The Joker has a good body of ore and promises to become a mine.

A tunnel is being driven on the New Alaska under contract by Angus McKenzie and partner. Mr. Charles F. Caldwell is the head of this Company.

The Hercules and the Indian are two claims which are expected to receive early attention. The Company holding the latter owns four claims on the west side of Cascade Creek, opposite the Bush Claims on the south end of the Missouri ridge, between the Salmon River glacier and the Cascade Creek. The claims are Portland No. 1, Portland No. 2, Big Dick, and Fritz. They are Crown-granted. They are at an elevation of 2400 feet and fourteen miles from Stewart. No work has been done on them since 1913.

Development consists of three open-cuts on the croppings and two tunnels. The open-cuts expose a vein from 12 to 20 ft. in width, which can be followed on the surface to the limit of the claims, about 2,000 feet. The vein is quartz and appears to follow a wide dioritic dyke which intrudes the greenstone-schists. The minerals of the quartz are galena, sphalerite, and pyrites. The first two open-cuts going up the hill show very little galena; the values are about $10 a ton in gold and silver for a width of 12 feet. The upper or main open-cut discloses the vein for a width of 20 feet, of which 5 to 8 feet in the centre is rich in galena, with zinc and galena on the hanging wall, while the balance of the vein on the foot-wall is of quartz and pyrites.

A tunnel has been driven on the vein for a little over 400 feet, showing each of the ore-shoots exposed on the surface. The No. 1 Shoot shows considerable galena at a depth of 150 feet with quartz pyrites predominating. The No. 2 Shoot is entirely of quartz and pyrites and will average about $10 a ton mainly in gold values. The No. 3, or main shoot, from the big cropping on the surface, was struck at about 400 feet in the tunnel and drifted on for 30 feet. The ore started from a seam on the foot-wall and has widened to 14 feet at the face, as exposed by two cross-cuts. Three sectional samples across the face averaged $2.40 in gold, 3.5 oz. siver, 10 per cent lead, and 16 per cent zinc. The hanging wall crosscut at the face is still in heavy zinc ore. Further work in driving this drift is considered important as the foot wall portion of the vein, carrying the galena, is widening and has all the appearance of developing into a good shoot.

The lower tunnel, 150 feet below No. 1, has been driven about 60 feet on the vein, in which there is from 1 to 3 feet of good ore on the hanging wall. On the upper end of the elaims there is a 6-inch seam of ore on the hanging wall assaying as high as $120 a ton in gold.

Adjoining the Indian Group on the North is the Boundary Group, owned by D. J. McIntominey and under bond to the Granby Consolidated Mining and Smelting Company. East of this Group and adjoining the Indian on the north is the Payroll Group, owned by W. Murphy, on which only assessment work has been done in recent years. This group is situated on the east bank of Silver Creek near its head. The vein has been exposed by three open-cuts showing about 8 inches of galena in a quartz vein which lies on a dip of 45 degrees. A tunnel has been driven forty feet on the vein from Silver Creek, 200 feet below the upper cut.

North and adjoining the Big Missouri Group is the property of the Hercules Mining Company, of Victoria, B. C., on which no work of importance has been done for some time. The Group consists of three claims, Yellowstone, Butte and Old Timer. It is under bond to C. F. Caldwell and associates. The formation is a continuation of the Big Missouri zone and the mineralization identical. Development work consists of seven open-cuts opening up a vein in places is 30 feet in width.

Mr. Bush has announced that a new company, the B. C. Silver Mines, Limited, has taken over the Lake and O'Leary Property between the Premier and the Bush Claims as well as the Mountain Group between the Premier and the International on Salmon River.

Late reports from Stewart and Hyder, the sister mining camps which, situated on the waterfront at the head of Portland Canal, the former on the Canadian side and the latter a few miles to the north and in

American territory, form the gateways to the Salmon River district indicate that both communities are humming. They are described—and this applies particularly to Hyder—as being typical old-time frontier mining towns. Hyder seems to be the centre of entertainment. Prospectors and miners from the mines in the interior to spend a holiday reach this town first and not infrequently return to the hills to earn the wherewithal for more indulgence without getting as far as Stewart. The town's buildings are built on piles. There is one main street, which runs in conformity with the sinuosities of the shore. It has its newspaper, as also has Stewart and both seem to flourish despite the compartive sparcity of population and what must be pretty keen competition.

An amusing phase of the life of Hyder is the activity of a character known as "Jack the Rescuer." A sharp twist in the main street, at a point where the sidewalk is without a protecting railing and where, below, is the cozy mud of the tide flats—sometimes covered with water to the depth of an average person's waist and at others with its slimy surface bared so that the spoutings of the sportive clams may be plainly seen—makes a veritable trap for the unwary. To say that absent minded, or temporarily befogged, pedestrians are frequently precipitated from the walk into the cold water and the mud is no exaggeration. In fact it happens so often that "Jack the Rescuer" earns a comfortable living, and a little over to have an occasional whirl on the roulette wheel, by standing at a post overlooking the critical spot, and, as they fall, pulling them back, wet, mud from head to feet and cussing most blasphemously, at a fee of $2.50 per rescue. Everybody knows the danger; everybody laughs at the other fellow's tumble; and yet; it would appear, Jack's business never grows slack. His rope was just as much in demand at last reports as it was at the beginning of Hyder's recently resuscitated and now hectic life. A few weeks ago the editor of Hyder's newspaper published a humorous story about some unfortunate's fall. The very next day, the writer, who had laughed, tripped and had need of the services of Jack the Rescuer. Never could there have been a more fitting illustration of the wisdom of the adage "he who laughs last laughs best."

But it must not be supposed that Hyder and Stewart are busy only in giving the workers some joy in life. Both look forward to becoming permanent communities of importance. That their future is bright is the opinion of mining men who have been into the Salmon River Country and of businessmen who have opened up in either one or the other of the towns. Not long ago it is reported that $50,000 worth of lots were sold in Hyder in one afternoon. When it is remembered that the town, for the most part has piles for its foundation, it must be admitted that this is "going some."

The High-Cost of Living, too, is an actuality in these camps, although it does not worry the miners much. All have plenty to eat because there are few without adequate funds and, for those who run short, there is work. Transportation of ore from the Premier Mine to the coast costs $121 a ton and the rate is the same for the transport of supplies the other way. The cost of hay is so high that those who have horses are shipping them to Porcher Island, situated at about the mouth of Portland Canal, for the winter. In the few months which must elapse before the spring opens and horses can be used, they would consume more than their value in feed. Hence the general exodus of horses to Porcher Islands. Forty head were brought down by the last outgoing boat.

Barkerville, B. C.

Robt. A. Bryce, a well-known Canadian engineer, who is in charge of the development work now underway at Proserpine Mountain, Cariboo District, visited the Coast recently. He called on Hon. Wm. Sloan, Minister of Mines, Victoria, B. C., to whom he spoke of the work being done by the Mining Corporation of Canada and referred optimistically to the prospects.

That the Armstrong and Dufferin Groups of Claims, which are situated on Grouse Creek, are to be thoroughly tested and that, if the results are what is expected, the exquipment necessary to the working of the properties on a large scale will be installed are statements made by Mr. Bryce. He says that he has assembled a good capable crew of men, that the veins are being systematically stripped, that considerable tunneling is to be done, and that, if progress continues at the present rate, the required definite knowledge of the properties should be obtained by the Spring.

The activity of Mr. Bryce and his associates in this district has attracted the attention of many prospectors. The hills are being thoroughly searched for mineral and many claims are being staked.

Among those who are trying their luck in the Cariboo are J. F. McConnell, a well-known newspaper writer of Vancouver, B. C., who has taken a lay on some promising placer ground. With him are associated "Tommy" Burns, former champion heavyweight pubilist; a sport writer, also of Vancouver, B. C.; and a civil engineer of the same City. Although they are somewhat new to the mining game with the exception of Mr. McConnell, who has had some experience in late years, they are reported to be working energetically. The results of their efforts are said to be satisfactory and it is not improbable that this partnership, odd as it may appears to many of their city friends, will reap a golden reward.

Cowichan, B. C.

The Manganese Property, known as Hill 60, has passed out of the prospect stage. It now is known to be a mine in its potentialities. Work has been suspended temporarily owing to the impassability of the roads, which condition is accounted for by recent heavy rains, and the Company is considering plans for the construction of an aerial tramway. This would materially reduce the cost and expedite transportation of ore from the mountain top. During the past two months eleven cars of the ore of this property have been shipped to the Bilrow Alloys Co., Tacoma, Wn., and the latter report that it is the best manganese ore they have handled. Sufficient development has been done to prove that a very large body of this high-grade manganese ore exists. The success of the enterprise, it is thought, may lead to the development of the manganese deposit of Shaw Creek, near Cowichan Lake, which received some attention during the latter days of the war, when the mineral was much in demand, but which has not as yet been systematically developed.

Nelson, B. C.

The Mountain Chief Copper Property at Renata, B. C., after much development with satisfactory results, is now in a position to commence regular shipments to the Trail Smelter at the rate of from 200 to 500 tons a week. Transportation facilities, however, permit no more at present than 200 tons a week and it is understood that this quantity will be forwarded as long as the Arrow Lakes are sufficiently free from ice

to permit passage of the lake barges. With the installation of a compressor and hoist, which is now taking place, and the provision of a motor truck to convey the ore from the lower terminal of the 3200-foot tram from the workings on Dog Creek to Renata, the mine is equipped for economical operation, and the next step will be in the direction of deep development by sinking.

Writing from the Slocan George Huston, a geologist who makes frequent visits to British Columbia and who now is engaged on examination work, describes impressions received as a result of a recent visit to the Noble Five Mine, in which James Dunsmuir, the wealthy coal operator of Victoria, B.C., is interested as follows:

"I was shown a sample of galena ore from the deep workings of the Noble Five Mine at Cody, near Sandon, which is a strong indication of durability with great depth in the Slocan Mines. This sample was taken from 20 inches of shipping ore out at a depth of 3,000 feet below the apex.

"Being familiar with the Coeur d'Alene mining and geodogical conditions, the point that impresses favorably is the almost entire absence of strong pressure in the sample, together with the unusual features that accompany ores taken at the same or greater depths in the Coeur d'Alene region.

Mining in the Coeur d'Alenes has not reached depths of from 3,000 to 4,000 feet below the apex, and a far different type of ore has been found to occur. There is a notable reduction in the size of the crystals, with a densifying of the structure and a greater intercrystallization between minerals. All this results in making a bad ore to mill, with greater losses in the operation and usually a lower grade of concentrate. Crushing and grinding are also more difficult, due to hardening and greater dissemination. The siderite usually found from the surface down changes to magnetite or coarse grained pyrite, or sometimes straight quartzose gangue. The features mentioned are the result of the enormous rock pressure exerted by great weight on the ore fissures.

"But the sample of the Noble Five, cut at 3,000 feet depth, shows a comparatively coarse crystal, brittle, loose structure, with the same minerals as gangue occurring near the surface. The sample has been but slightly affected by the pressure of rock weight, and is as easy to handle in a milling or sorting and crushing sense as ores near the surface. It is generally admitted that there is a lowering of the silver value to the unit of lead in the Coeur d'Alenes at great depth, but the Noble Five samples holds its usual percentage, and from other Slocan ores studied I found the same rule to prevail.

"A great deal of the silver ore in the United States is being treated by chemical processes, and escapes the smelter's handling.

"With lead ore decreasing in the silver content there now is a sharp demand for galenas carrying good silver values from the smelting plants to the south. This is bound to result in future competition in the effort to fatten up the bullion, and I look to see an influx of mining people to British Columbia during the next year from this feature alone."

C. F. Caldwell, prominent in British Columbia, where he has been engaged for years as a mine operator, has returned from a visit to Eastern Canada and the United States with the report that the East "is awake to the mining wealth of the British Columbia interior, to the riches of the coast mineral region and of the great northland." He says that a knowledge of the possibilities of these sections as an investment field is gaining ground, and there is no doubt that capital may be had for important development enterprises."

He warns the public men of the Province, however, that, if capital is to be secured, it must be reasonably sure of protection. "The richest zinc mines in the world lie in the Slocan," he continues, "and by lack of government protection are worthless because of market conditions and the smelting system. As a consequence of this system the Consolidated Mining & Smelting Co. of Canada is the only one that can buy a zinc mine."

Mr. Caldwell concludes:

"Having worked steadily for over two years for a royal commission on smelting, to consist of one member chosen by the mine owners, one by the smelter management and one by the government—a request I do not think ever will be granted unless the Associated Boards of Trade endorse it—I would ask all owners of zinc properties to urge this body to ask such a Commission of the Government. I would draw attention to the fact that the company is paying only 2 cts. a lb. for zinc, and only for the short time that the Sullivan Mine, by reason of the strike, is not producing. Considering the price in the United States market, recently 7 cents at New York, I believe the shipper ought to receive all excess over four cents."

Hon. J. W. de B. Farris, Attorney General of British Columbia, in an address delivered recently at Nelson, B.C., referred to the extensive development of the mineral resources of the Provinces in recent years and enumerated some of the enterprises either under way or planned. In the latter connection he said: "We are told by the manager of the Consolidated Mining & Smelting Co. of Canada that they are about to erect a $1,000,000 concentrator at Rossland or Trail and an even larger one at the Sullivan Mine, Kimberley. We also are told that the West Kootenay Power & Light Company will have to double its capacity immediately almost to carry on. These are only some of the expansions and developments we are hearing about."

Smithers, B.C.

Work has been resumed on the long tunnel at the Babine Bonanza. This will have to be carried 1,000 feet before the vein is struck. It now is in some 300 feet. James Cronin, the owner has been engaged recently in preparing for the continuance of the work engaging men and forwarding the necessary supplies. When the men reached the camp they found it in a chaotic condition. The cook house had been forced by bears, presumably one or more grizzlies, and about one hundred pounds of butter, a similar quantity of bacon and ham had been consumed. Stoves, tables, dishes, and most of the furniture had been thrown about and much damaged. The destructive visitors, however, had decamped. This is not the first time that the camp has been visited during the absence of the owner and his men with the same results.

Lillooet, B.C.

The purchase of the Pioneer Mine situated on Cadwallader Creek, Lillooet, B.C., near the line of the Pacific Great Eastern Ry., for $100,000 by the Mining

Corporation of Canada is announced by W. R. P. Parker, vice-president of that company. The former owners of the property were Adolphus Williams, K.C., of Vancouver, B.C., and the Ferguson Brothers, the latter being the active members of the partnership. The latter have developed the mine and in the course of their operations in the past three years have taken out considerable gold which has been sent to the Dominion Assay Office, Vancouver. With enlarged equipment and the development of new ore bodies the Mining Corporation expects to substantially increase the output.

Mr. Parker intimates that it is not unlikely that his company will extend its operations in this Province, having a profit and loss account of $2,500,000 set apart for the acquisition and the development of new holdings. It is at present assisting in the development of properties in the Barkerville District, Cariboo, B.C., to which reference already has been made

"We have engineers," states Mr Parker, "in South America, Mexico, Manchuria, and other parts of the world and my only regret is that we did not turn our attention to British Columbia earlier."

Princess Royal Island, B.C.

The Belmont Surf Inlet Mines, Ltd., operating one of the largest gold producing properties in British Columbia is reported to be improving working conditions at their camp. A model little town is being built, homes and public buildings, all being equipped with electric light, steam heating, and running water. There is a fine modern club hotel, as well as churches, post office and school. The mine output is shipped to the Tacoma Smelter. Surf Inlet is one of the most prosperous and wealthy mining camps of the north.

Grand Forks, B.C.

An issue developed recently between the Great Northern Ry. Co. and the Granby Consolidated Mining & Smelting Co., Ltd., when the former commenced the removal of steel rails laid between the Granby Company's smelter at Grand Forks and the railway company's main line. It appears that the mining company maintains that as these sidings were constructed at its expense the steel cannot be taken away without its consent. At any rate the work was stopped when the matter was taken up with the authorities. It is understood that the removal of much of the trackage would not materially affect the Granby Company, the smelter being also served by the C.P.R., but one of the sidings which circled the plant and was the shipping outlet for both transportation lines is of first importance, as over these rails, should the smelter not be operated again, the machinery would be carried for use elsewhere. The Great Northern Company is dismantling its branch line to the former mining town of Phoenix. This work was interrupted by a recent heavy snowfall, and it was after this that workmen turned their attention to the smelter sidings.

The International Diamond Drill Company, Spokane, Wn., has a diamond drill outfit in storage at Grand Forks, B.C., the intention being, it is understood, to start drilling on some properties at Franklin Camp in the spring This plant came from the Snowstorm Group, Highland Valley, where the company has been engaged in drilling for the Mine Department of the Provincial Government.

Trail, B.C.

Ore receipts in gross tons for the week from November 7th to the 14th, inclusive, at the Trail Smelter of the Consolidated Mining & Smelting Company of Canada aggregated 5,596, making the total for the year 285,268 tons. The chief independent shippers were as follows: Blue Bell, Riondell, 92 tons; Echo, Silverton, 206; Iron Mask, Kamloops, 160; Josie (Le Roi) Rossland, 266; Mandy, Le Pas, Manitoba, 153; Mountain Chief, Renata, 145; North Star, Kimberley, 467; Providence, Greenwood, 29; Rambler-Cariboo, Rambler, 194; Ruth, Cedar Creek, 167; Standard, Silverton, 558; and Whitewater, Ratallack, 63. Of the company's properties the largest shippers were the Centre Star, Rossland, with 1,336 tons and the Emma, Eholt, with 1,307 tons. The Sullivan Mine still nis not producing.

Vancouver, B.C.

H. E. Bodine, well known in this province as a mining engineer and prospector, has returned from a trip into Alaska with the United States Geological Survey. He reports that one of the principal members of the party, S. R. Crapps, feel over a cliff and broke both arms and both legs. He was carried out to Anchorage and is recovering. The party were inland on July 23rd and were out for 56 days, on 48 of which it rained.

"The most remarkable feature of the landscape is the magnificent peak of Mount McKinley, said Mr. Bodine. "The story of Dr. Cook, the Arctic explorer, that he had climbed it is undoubtedly a fake, and it is at least 30 miles from the foot of the range to the top of the peak, and it is all more or less like the side of a house.

"From a geological standpoint the extraordinary 'Blue Lead' on the western slope of the Alaska range is the outstanding feature. It is a narrow fissure from three feet to thirty feet wide, extending for over 30 miles. Beneath are a few feet of glacial drift of a character not found anywhere else in the world. It is a conglomerate rock which disintegrates on exposure to the air. This mixture is made up not only of the round pebbles usually found, but of sharp-edged pieces which apparently have never been exposed to the action of water or to contact with each other.

"Along this 'Blue Lead' at various points hydraulic plants have been installed."

Mr. Bodine is leaving shortly for the Lardo District, British Columbia, to undertake the superintendence of the Beatrice, a silver lead mine owned by the New Era Mines, Ltd.

METAL QUOTATIONS.

Fair prices for ingot metals in Montreal 3rd December, 1919.

Electro copper	23½c
Casting copper	23c
Lead	8c
Tin	59c
Zinc	10¼c
Antimony	11lc
Aluminum	32c

Steel Bars	3.10
Plate	$3.35

Talc and Soapstone

By Raymond B. Ladoo, U.S. Bureau of Mines, by Permission of the Director.

Word Resources of Talc and Soapstone.

Talc and soapstone together with pyrophyllite (usually sold as talc) are very widely distributed over the earth. Deposits are known in nearly every country but the production on a commercial scale has largely been confined to the countries of highest industrial development. Thus the United States produces about 65 per cent, France, 13.4 per cent; Italy, 7.4 per cent; Germany and Austria, 5.4 per cent, and Canada 4.7 per cent. Since soapstone, used in slabs and fabricated articles, such as sinks and tubs, is produced in important quantities only in this country, this discussion will be largely confined to various grades of ground and massive talc. It should be noted, however, that the aborigines in this country and the natives of many other countries, such as India, and Brazil, made use of, and still make use of massive soapstone in the manufacture of pots and kettles.

While the most valuable grade of ground talc is that used for toilet purposes, by far the largest production is of the lower grades, used in the manufacture of paper, rubber, paint, prepared roofing, and other industrial uses. Since the lower grades of talc will not stand high transportation charges, it follows that the greatest production will come from the countries and districts which have best developed the industrial uses. In the United States, Germany, and Austria, many uses have been found for the lower grades of talc. In France and Italy the principal product shipped is high grade talc for toilet purposes and massive tale for the manufacture of lava, but some use is made of the lower grades. In most of the other producing countries there is little or no market for anything but the highest grades. Thus India, Brazil, Japan and Spain, with many known deposits, produce only small quantities. The accompanying table indicates the approximate distribution of production:

World's Production of Talc and Soapstone.

(In 2000 lb. tons.)

Country	1911	1912	1913	1916	1917	Per cent of total
U.S. (a)	143,551	159,270	175,883	212,961	218,848	65.0
France (b) ...	44,092	60,629	66,332	.....	45,000*	13.4
Italy (c)	15,600	15,800	23,530	28,586	25,000*	7.4
Canada (c) ..	7,300	8,270	12,250	13,104	15,803	4.7
Austria (c) ..	15,212	.....	.....	.....	15,000*	4.4
Norway (c) ..	.....	885	1,653	6,063	6,000*	1.8
Spain (d) ...	6,226	.....	.....	1,062	5,000*	1.5
Germany (Bavaria) (d)...	3,728	3,551	.....	.....	3,500*	1.0
India (c)	689	882	1,350	1,010	1,900	0.6
British So. Africa (c) ...	.....	.....	.....	132	785	0.2
Totals					336,836	100.0

* Statistics unavailable. Figures represent producing capacity estimated for obtaining approximate world production.

(a) Talc and soapstone.

(b) Talc, soapstone and asbestos.

(c) Talc.

(d) Soapstone.

The United States.

The production of talc in the United States in 1917 was divided as follows:*

State.	Short tons.	Value.	Average price per ton.
Vermont	93,960	$625,150	$6.65
New York	74,671	881,462	11.80
Virginia	6,432	85,856	13.35
California	4,152	74,000	17.82
Georgia	3,819	94,314	24.70
North Carolina	2,175	41,766	19.20
Maryland, Mass., New Jersey, and Pa.....	13,404	87,124	6.50
Totals	198,613	1,889,672	$9.51

The entire production of soapstone in 1917, 20,235 tons, came from Virginia.

Detailed descriptions of the deposits in the different States have been given by J. S. Diller in Mineral Resources, U.S. Geological Survey, 1917, and previous years and need not be repeated here. It is of interest to note, however, that the greatest production is centered in New York and Vermont, and that California is becoming an important producer of high grade talc. Vermont has the largest reserves, clearly blocked out, of all producing States.

France.

The most important producing properties in France are in the Department of Ariège. Important deposits are at Montferrier, in the Pyrénées, about 12 miles from the Spanish line, and at Luzech. Another producing district is at Luzenac, near the port of Cette. Eighty-five per cent of the production comes from the Department of Ariège. French or tailors' chalk is produced principally in the Dept. of Gard. Other districts in which talc and soapstone are mined are in the following departments, named in order of importance: Pyrénées-Orientales, Isère, Ande, Savoie, Loire (Haute), and the Island of Corsica. Immediately before the war the production of talc was rapidly increasing, but the scarcity of labor during the war made the production almost negligible. It is probable that the mining will soon be resumed on its former scale.

Italy.

The highest grade talcs in the world are mined in Italy. Their superior color, freedom from grit and impurities and fineness of grain make them especially suited for toilet and medicinal uses and for lava blanks. The main producing district is in the Italian Alps in the neighborhood of Perosa, south of Turin, in the Vallee di Chisone. It is also mined near Pinerolo and in the valleys of San Murtino, Susa and Lanzo.

Canada.

Canadian talcs generally command a slightly higher price than those of the eastern United States, some being suitable for certain grades of toilet powder, but most are used in the industries which demand a medium high grade talc. The principal production comes from a group of mines near Madoc, Hastings Co., Ontario. Several small mines have been operated in

* U.S. Geological Survey, Mineral Resources, 1917.

Brome, Megantic, Montmorency, and Wolfe Counties, Quebec, and in Cariboo Co., and a few other localities in British Columbia. The production of the Madoc district has been rapidly increasing and probably will be an increasingly important factor.

Austria-Hungary.

Austria before the war produced a tonnage equivalent to about 4.4 per cent of the present world production of talc and soapstone. The principal deposits of talc in Austria are in the Province of Styria in the communes of Mautern, Aflenz, Anger, Pollau, St. Kathrein, and Floing. Other producing districts are in Salzburg, Grusserhof and Rohonez, Hungary. The talc is of a high grade but not equal to that from Italy. Much of the Austrian talc was used in Germany for paper making. Austrian producers before the war were keenly alive to the possibilities of utilization of talc and formed an association which published results of research and notes on many new uses.

Spain.

Talc production of Spain is small and comes principally from the Province of Gerona in the Pyrénées, but one mine is reported in the Province of Malaga.

Germany.

Important talc deposits are reported at Gopfersgrun, near Wunsiedel, in the Fichtelgebirge, Bavaria, from which most of the German production came before the war.

India.

Massive talc of excellent quality has been mined in India for years, the natives making use of it for pots and kettles, but export trade has become of importance due to the particular suitability of Indian talc for lava manufacture. The largest production at present comes from the Jabalpur district in the Central Provinces. Other producing districts are in the Provinces of Madras, Rajputna, Mysore, Bengal, Burma, Bombay, and Central India. Veins are usually thin but of high grade. Resources are said to be large.

British South Africa.

Talc is found in Natal and Rhodesia, but the most important production comes from the Barberton district in the Transvaal. Large bodies of more or less pure talc occur both in Rhodesia and Transvaal. In the Barberton district pencils, tailors' chalk, billiard chalk, and ground talc are produced. An important industry sprung up during the war and practically all local needs were supplied. It is stated that a large export trade is looked for when shipping becomes normal.

Brazil.

While no export trade in talc or soapstone is reported, Brazil promises to be a future source of importance. A very pure white talc is reported at Rezende, State of Rio de Janeiro. Deposits at Lorena and Santo Amaro, both in the State of Sao Paulo are also being worked. Good grades of massive talc, at present worked only by natives for local uses, occur near Itaberaba, Bahia; Municipio de Ouro Preto; Varzea near Dores de Boa Esperanca; near Jacuhy in western Minas Geraes; and in the State of Ceara, and Goyaz.

China.

Massive talc or high grade soapstone has been mined for years in China, for the manufacture of carved utensils, images and ornaments. Much of the material, while ideal for carving, is too highly colored for ground talc. The principal district has been the Tsintien region, Chekiang province, about 42 miles from Wenchow. It is also found in the Provinces of Chihli and Fukien.

Norway.

Talc and soapstone both occur in Norway. Soapstone from Gudbrandsdal is used in the Cathedral of Trondhjems. Mills for the grinding of local talcs have been erected at the Songefjord, north of Bergen and in Cistesto, Vikor, south of Bergen. In 1912-14 the entire production came from Froastad, Isteso, and Hardanger in the S. Bergenhus province, and in 1916 from N. Bergenhus.

Japan.

Both talc and pyrophyllite are found in Japan in the Provinces of Hitachi, Kozuke, Musachi, Omi, Bizen, Suo, Hizen, Higo, Harima, Bingo and Aki. Small imports of Japanese talc have been received in this country, and it is probable that Japan is a potential source of some importance.

British Isles.

While the mining of talc and soapstone is not of importance today in the British Isles, several deposits are known and have been worked. Among these may be mentioned the Lizard district in Cornwall; Crohy Head and Gartan near Letterkenny in County Donegal, Ireland; the Shetland Isles, the Hebridges (Harris), and Shiness in Sutherland.

Philippines.

Several deposits of high grade fibrous talc are known in Illocos Norte. From tests and analyses this talc seems to be of excellent quality for paper filling and may become an important source in the future.

Talc of a grade suitable for paper, etc., is reported as occuring near Heathcote, Australia. Deposits of talc of various grades occur in French South Africa, Jamaica, Sweden, the Netherlands, and Belgium from which countries small imports into the United States have been received. Talc of excellent quality but in small quantities comes from Syria, Mexico, New Zealand, and in fact almost every country possesses some resources of talc or soapstone.

Accurate data upon reserves is very difficult to obtain, but it is probable, from the wide distribution of known, but at present unworked deposits, that there are ample supplies for years to come. Probably the United States will continue to lead in production, but the western States will doubtless become of increasing importance. Deposits are now being worked in California and Washington and many other occurences have been noted in the Coast Range, the Sierra Nevadas and in the Rockies. Our position in this field thus seems secure.

A Summer Road to Rice Lake.

It is said that the Manitoba government is favorably disposed towards the proposals to build a summer road to Rice Lake and that surveyors will soon be at work looking over the various routes. There is considerable difference of opinion as to the most suitable route. The present winter road from Fort Alexander crosses much muskeg and would not be suitable in summer. Alternative routes are up the river from Black River settlement or along the sand ridges from Manigotogan. Another route would be from Lac du Bonnet to Long Lake and thence to Rice Lake.

MANITOBA CORRESPONDENCE.

Pan Extension.

Plans for the development of the Pan Extension property, which adjoins the Gold Pan mine, call for the erection this winter of bunk house, boiler house, cook house and smaller buildings. There will be purchased a small hoist, a 3 drill air compressor, boiler engines and pumps.

In 1917 some work was done on property under the superintendence of Mr. Reahill. A shaft was sunk to a depth of 50 feet. The vein is 4½ to 5 feet wide and Mr. Reahill says that good ore was encountered to the bottom of the shaft. This shaft is about 300 feet from the 260 ft. shaft on the Gold Pan. The company owns two claims, one adjoining Gold Pan on the west is known as the Gold Pan Fraction. The second claim, known as the Sunlight, is a short distance east of the Gold Pan. Mr. John Beckman is secretary of the company.

Prospectors' Classes at University of Manitoba.

Instruction in mineralogy is now being given two evenings each week at the University of Manitoba by Professor J. S. DeLury. These classes are open to anyone who wishes to obtain an elementary knowledge of the science of ore deposits.

Bruce Consolidated.

The Bruce Consolidated mining company, which will develop properties in the Rice Lake district this winter, owns the September Morn, Bruce, Brucehor, Bruce Fraction, Mina and Canada claims. These were located by J. J. Papineau, who located the Moose claim. The properties have been reported upon favorably by Professor J. S. DeLury.

Steel Map of Rice Lake Gold Districts.

The accompanying sketch map shows the location of a number of gold properties in the vicinity of Gold Lake and Long Lake. Chief activity during the past summer has been at the Brooklyn mine at Gold Lake. Other properties in the immediate vicinity of the Brooklyn will be developed this winter.

The map shows the routes to the camp from Lake Winnipeg. The summer route is up the Manigotogan river and across Clearwater lake to the Gold Pan property. The winter road from Fort Alexander is shown in dotted line. At the 23 mile post where it crosses Black River, there is a claim used as a stopping place. The winter road from Manigotogan is also shown. This is shorter, but to use it necessitates the crossing of Lake Winnipeg. Fort Alexander can be reached by a 14 mile winter road from the Canadian National railroad. The all land route is however not yet in good shape for travel, as there is little frost in the ground and the snow is already deep. Those who have travelled from the mine during the past few weeks have used dog teams. One party came down the Fort Alexander road to the Black river, then down the river to Lake Winnipeg and crossed on the ice to mile 69—near Victoria Beach on the C. N. R. Another party from the Brooklyn followed the Hole river down to the lake and then walked down the shore of lake Winnipeg. It is expected that the winter road will be soon in condition for travelling by horses from the railway via Fort Alexander.

Eastern Mining and Milling Co.

Good results are being obtained at the copper mine of the Eastern Mining and Milling Co., at Eastman. Quebec. Preparations are being made to mine the ore at the 80, 130, and 260 feet. levels. The new plant for the mill is now on the property and two of the three Hardinge mills are now installed. When the three mills are in operation the capacity of the plant will be about 250 tons per day.

The company uses the oil flotation process and ships the concentrate to the United States. Investigations are under way which it is hoped will result in the refining of the concentrates on the property. The preliminary experiments indicate that an economical process of refining will be found and it is not unlikely that an electrolytic copper refinery will be built at the mine. Mr. F. M. Connell of Toronto is president and general manager of the company which is operating the mine at Eastman, Quebec.

FORWARD TENDENCY IN ENGINEERING.

General Mitchell addresses first meeting of season of American Society of Mechanical Engineers, Ontario Section, at Toronto.

The American Society of Mechanical Engineers, Ontario Section, held their first meeting for the season on the evening of Nov. 14th in Toronto. The gathering took the form of a dinner at the Engineers' Club, following which General C. H. Mitchell, C.B., C.M.G., D.S.O., spoke on some phases of mechanical engineering in the war, which had come under his observation in France and Italy. General Mitchell, who went over with the First Contingent in 1914 as Intelligence Officer, served with great distinction, first in France and then as Intelligence Officer on the general staff of the British expedition sent to the aid of the Italians on the Piave. His address covered transportation matters and mobile shops and other engineering features of the advanced areas in France. He made some very interesting observations on the Italian Hydro Electric developments as he found them at the end of the war in comparison with their condition and size at the time of a previous trip in 1906. He gave a vivid description of the Italian engineering feats in the construction of the "Teleferrica", or wire cable-ways, which transported men and munitions in hanging carriers over mountain peaks and across great chasms, even when subject to a great hazard due to shell fire.

General Mitchell, who is the new Dean of Engineering, as well as an old graduate of the Faculty of Applied Science, University of Toronto, closed with a description of after-the-war conditions at the University and drew some deductions as to the trend of engineering opportunities in different channels, as indicated by the tendency of certain branches, notably mechanical engineering and engineering chemistry, to push ahead at the present time.

After the General's address the meeting proceeded to discuss plans for the season's work and the program of one meeting per month, alternately with a dinner with an address and a technical session, was decided upon. A large number of prospective members were present and all mechanical engineers of the district are invited to participate in these meetings, with the hope that they will ultimately join. It is felt that when members come from as far away as Chatham, London and Belleville to attend, there is little excuse for local engineers failing to identify themselves with the parent organization of this branch of engineering.

Mr. James McEvoy who recently returned from a trip to the Belcher Islands, where he examined iron ore deposits, has taken office quarters in Yonge Street Arcade, Toronto.

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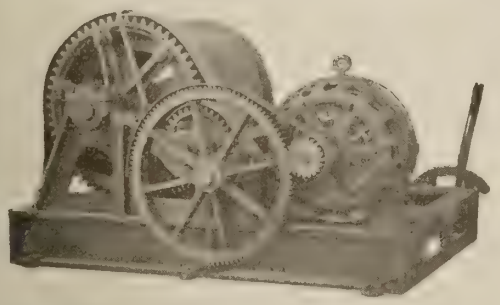

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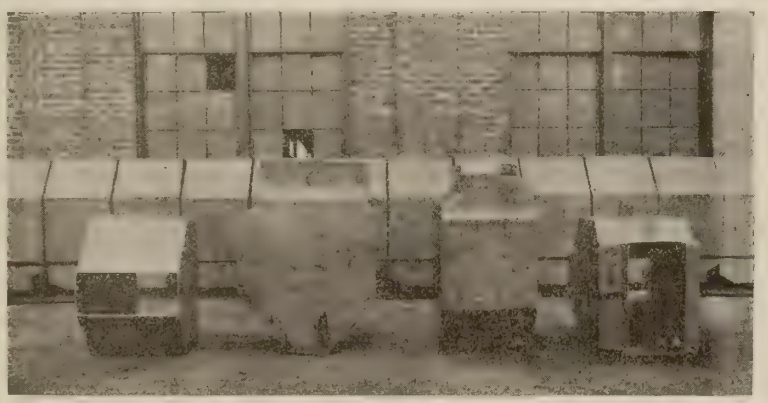

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:-: EDITORIAL :-:

AN UNJUSTIFIED ASSUMPTION.

One of the Toronto dailies has made a surprising discovery, to wit, that the article by Mr. Burns which recently appeared in the "Journal" advocating the electrification of the Canadian National Railway in the Maritime Provinces was inspired by the "coal barons" of Nova Scotia, and makes this statement: "The mine-"owners have inspired a campaign for the electrifica-"tion of the National Railways between Sydney, Hali-"fax, and Montreal, with the Halifax-Moncton mileage "for first choice." Torontonian perspicuity could scarcely go further. In detecting in Mr. Burns the spokesman of the "coal barons" of Nova Scotia, and in an editorial discussion of the merits of railway electrification a covert proposal to "nationalize Joggins," this Toronto paper achieves the feat of seeing something that is not there, and, moreover, betrays much ignorance of many things.

This same newspaper indulges in much laudation of Mr. Hanna, the President of the C. N. Railways, because of the manner in which he treated the coal operators of Nova Scotia, intimating that they were asking profiteering prices for their coal. As a proof of the proficiency of the C. N. R. Board in handling coal operators as they should be handled, it is said Mr. Hanna, sent down expert accountants to Nova Scotia to inspect the books of the coal companies, a procedure which this Toronto paper elegantly explains "got the goat" of the coal operators. It is not stated, however, that these same accountants found the statements of the coal operators to be accurate and in no way overstated.

It appears also to be believed in Toronto, if the newspaper referred to correctly expresses itself, that the high price of coal in Nova Scotia is an act of the coal companies, who are unduly profiting thereby. This assumption is as incorrect and as fantastical as the suggested aim of "nationalizing Joggins."

The causes of the high cost of coal in Nova Scotia are well known. They include a one hundred per cent increase in wages to the mineworkers, a forty per cent decrease in production, and increases in the costs of mine supplies such as pit-timber, brattice cloth, rails, metals, explosives, oils, horse-feed, wire-ropes, electrical supplies, and taxation which are a matter of common knowledge and widespread application.

The rivalry between Toronto and Montreal has many entertaining facets, but it is not good for Canada that the President of its national railways, or a thoughtful article such as that of our contributor, written, as we know, without ulterior motive, and the well being of a national industry, should be dragged into a purposeless discussion which has its real origin in the railway strategy of rival cities.

It may also be pointed out that the gravamen of our argument was that the Maritime Provinces were undeveloped because of the inadequate transportation facilities on land; that "the coal mined in Nova Scotia has "for generations gone to provide the driving power for "the industries of New England, Quebec and Ontario, "and has, in large part, been followed by the youth and "energy of the Province." The remedy proposed was the generation of moderately-priced electrical energy at the coal-pit mouth, and the associated development of transportation lines and local manufacturing industries based on relatively cheap power costs.

These reasons are admitted to be good, but, states this Toronto paper, "we are a little suspicious of advice that comes from the 'barons' ' quarter." No one, we imagine, will be more amused at this sapient conjecture than the aforesaid "barons."

The irresponsible nature of the Toronto comment referred to is clearly shown by a later editorial in the same newspaper, which states: "The steam locomotive "is a wasteful machine. In hauling a train of coal "across the continent it consumes one-third of the cargo "in making a round trip. We must as far as possible electrify our national railway system." Precisely so.

THE C.M.I. INSTITUTE MEETING AT VANCOUVER.

The Vancouver Meeting was well attended. The papers read were excellent, inasmuch as they told of new mineral discoveries, new and immensely improved coal mining plants and colliery housing, new processes in metallurgy, new movements amongst technical men, and potential industries in what is yet but a new country. Reasoned optimism characterized all the papers and enlivened the discussions.

Are not these things all outward signs of the inherent strength of the western branches of the Canadian Mining Institute, and the vigor of the industry the western members direct?

The "Journal" especially desires to congratulate the Vancouver newspapers on the accurate and understanding publicity given to the proceedings of the meeting, which is in favorable contract to the scant space devoted to the proceedings of the Institute on the occasion of its annual meetings in the cities of the East.

The Canadian Mining Institute in Annual Meeting at Vancouver, B.C.

26th to 29th November 1919.

Three hundred members of the Canadian Mining Institute assembled at the Vancouver Hotel on the 26th November to take part in an unusual event, a meeting of Institute members in annual general gathering in British Columbia. The meeting was as unqualifiedly successful as it was unusual, and promised that future Western Annual General Meetings of the Institute will be equally as successful as they will become usual.

The members in attendance were naturally chiefly from British Columbia points—which does not necessarily imply that they did not travel far to attend the meeting—but there was a fair representation from the Alberta branches, and several from Quebec. More would have been present from Alberta, but for the more or less permanent condition of labour trouble in that province. The State of Washington was well represented, following a pleasant custom of western mining gatherings.

The City of Vancouver had previous to the meeting sent out to all members of the Institute an invitation to come to Vancouver, and the formal opening of the business of the meeting was preceded by an address of welcome from Mr. R. H. Gale, the Mayor of Vancouver, who felicitously and correctly welcomed the Institute to a city which was "the industrial capital of one of the richest mining districts in the world."

The chair was taken by Mr. S. S. Fowler of Nelson, in the unavoidable absence of the President of the Institute, who had intended to be present, but was unable to sail from England until the 25th.

Much interest was added to the proceedings by the presence of members of the faculty of the Universities of Washington and British Columbia and by past and present members of the Canadian Geological Survey.

MORNING SESSION, WEDNESDAY, 26 NOV.

The first subject discussed at the morning session of Wednesday was how best to extend the fields of the Institute's usefulness in the West.

Mr. Fowler, the Chairman, deplored the fact that the mining industry of British Columbia was not represented in the manner in which it had been hoped for. He stated that he and two others formed the entire representation of British Columbia mining men from the interior. He appealed for greater interest to be displayed by mining men in their own organization and a more active part to be taken in the conduct of its affairs and the contributions to the proceedings at the branch and general meetings.

Professor Hodges, who is acting secretary of the meeting, said that Canada was entering upon a new era as regards the relationships between the government and the mining industry, between the employer and the employd and between the professional and business interests that direct mining matters. The day had passed he said, when the institute could confine its interests to the technical side of mining. If it is going to continue to be a worth-while organization, it must take a more active part in all public matters as far as they relate to mining. To do this the institute must be representative; it must include employers and employed, the professional man, the miner and the prospector, and all connected in any way with the industry. The institute should enter politics, not as a political party, but as a party representing the mining industry.

It should give its endorsation or express its disapproval of every legislative proposal that affects mining. It must tell the government what the industry wants or does not want, and must be strong enough to speak on behalf of the whole industry. He pointed to conditions in the past when a few of the big mining companies presented their points of view at Ottawa with the result that no consistent representation of the industry as a whole was given. The viewpoint of the industry as a whole should be given by the institute, he contended, and he expressed the opinion that it would be very regrettable if the present meeting adjourned without taking some steps to make this possible.

Considerable discussion ensued, among those taking part being Dean R. W. Brock of the University of B.C., Messrs. Drummond, Lamb, and several others, but resolutions dealing with the matter were deferred for submission to the resolutions committee for consideration at a later session.

Free Importation of Machinery.

The resolution to be submitted to the meeting regarding the free importation of mining machinery was framed by a special committee appointed some time ago by the Institute to consider the matter. Mr. Louis Simpson of Ottawa prepared a paper on the subject, giving the reasons for the resolution which had been prepared, which calls for the importation into Canada of all machinery used in a basic industry, imported by the user, free from duty or war tax unless such machinery be placed on a list to be compiled by the Minister of Finance after hearing evidence on the matter and given free opportunity for representations from interested parties, this list not to include any machinery not made in Canada of the capacity stated, or equal quality to that hitherto imported and being offered for sale in this country at reasonable cost.

The resolution was presented by Mr. E. E. Campbell of Anyox, a member of the special committee, who stated that Mr. Simpson has informed him that the resolution would be endorsed by the tariff committee of the Manufacturers' Association of Canada. The resolution will come up for discussion at a later session of the meeting after passing through the hands of the resolution committee.

Returned Soldier Inspectors.

Mr. S. S. Fowler in introducing the subject of the employment of returned soldiers by the government in prospecting certain areas of the Dominion, said that the proposal was one of the greatest importance for the future of the mining industry in Canada and would be of peculiar value as regards certain areas such as the northeastern portion of this province. He pointed out that the race of prospectors was disappearing owing to the decreasing speculation in mining claims, which made the prospector's reward so precarious that he was not content to engage in an arduous occupation in the hope of little return beyond the grub stake, and

that there were fewer who would now speculate to the extent necessary to outfit prospectors.

He described the action that had already been taken. A plan whereby bodies of prospectors, all returned soldiers, would be sent out under the guidance of experienced geologists, the men to be paid by the government and to be given in addition a share of the proceeds from any finds which they may make in the areas to be approved by the department of mines, had been proposed to the government. On the grounds that it savored of class legislation the government had turned down the proposal, although it had been supported by a number of other influential bodies and had been endorsed by the Institute of Civil Engineers and the G. W. V. A., besides a number of boards of trade. It was intended now to re-introduce the proposal by way of approaching individual members of parliament in order to secure its appearance in concrete shape at the next session of parliament.

Professor Wallace introduced a resolution expressing the renewed endorsation of the plan by the Canadian Mining Institute and the opinion that immediate steps should be taken in order that the plan may be put in force early next year. The speaker pointed out that in view of the government's contention that this was class legislation the question of the land settlement scheme immediately arose. Mining was the next greatest industry in the Dominion to agriculture.

Mr. Fleet Robertson of Victoria said that he had been in communication with Gen. Leckie, who was very anxious to see the scheme again put forward, both on behalf of the returned men and on behalf of the mining development of the Dominion.

Mr. Sloan Will Help Scheme.

Mr. Nicol Thompson, chairman of the Mining Bureau of the Vancouver Board of Trade, said that that body had approached both the Provincial and Dominion governments on the matter. The Federal Government had informed them that they had already refused to take up the matter, but the Hon. Mr. Sloan had promised that the scheme should be taken up at the coming session of the provincial legislature with a view to adopting some portion of it for British Columbia.

Dean Brock was of opinion that the instruction suitable for prospectors should form part of the curriculum adopted by the department of Soldiers' Civil Re-Establishment for the education of returned men.

The remainder of the opening session of the convention was concerned with matters of membership and organization of the institute, a general desire being expressed for changes which will enlarge the basis of the institute and result in greater interest being taken in its meetings and deliberations.

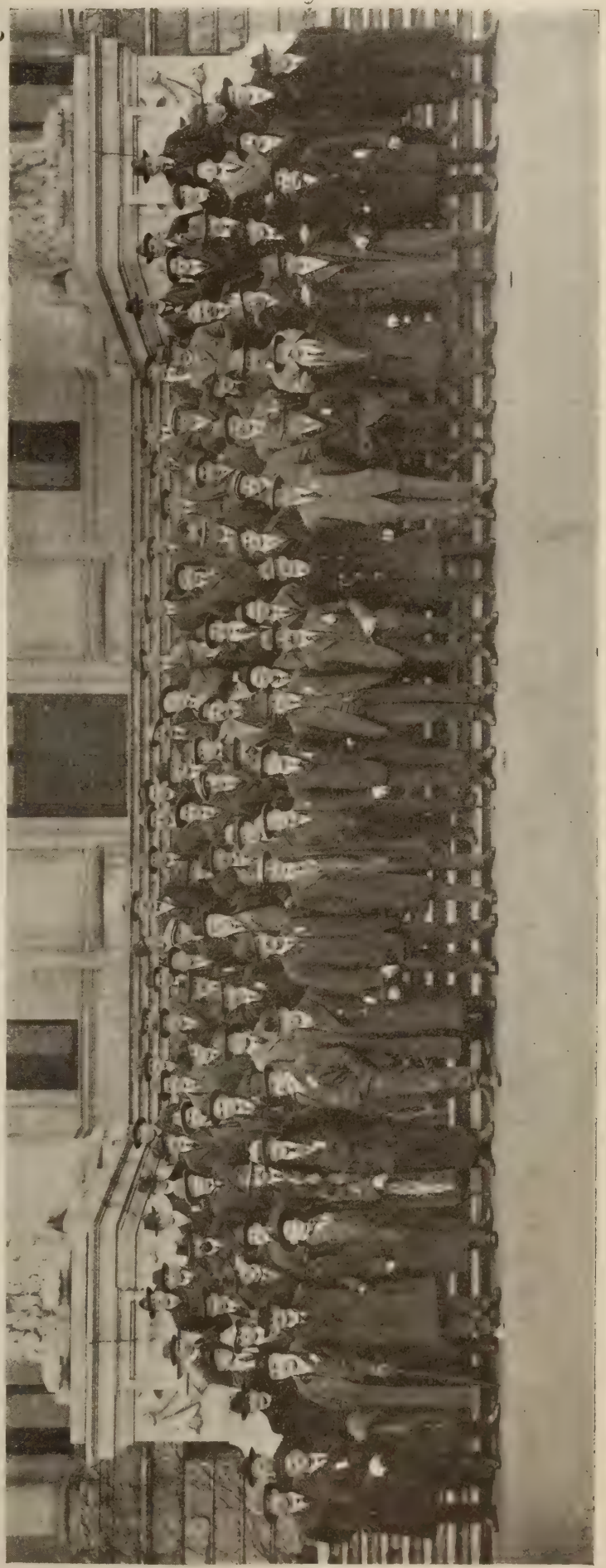
AFTERNOON SESSION, WEDNESDAY, 26th

Mr. O. E. S. Whiteside's paper on "The Future of Coal in Alberta" was not presented, much to the regret of the members, Mr. Whiteside having been prevented from attendance by labor matters.

It is to be hoped that Mr. Whiteside's paper will find its way into the Transactions as the future of coal in Alberta is to a large extent synonymous with the future of Canadian industries.

THE CASSIDY COLLIERY.

Mr. E. G. Wilson, superintendent of the Cassidy Colliery of the Granby Consolidated Mining & Smelting



Members of the Canadian Mining Institute, in attendance at the Vancouver Meeting, 26th-28th November, 1919, photographed on the steps of the Court House.

Company read a paper describing the newly completed plant which is situated inland on the Nanaimo River about eight miles from Nanaimo on Vancouver Island.

A brief description of this remarkable colliery has already appeared in the "Journal" and in a later issue it is hoped to include a detailed description, and photographs of a colliery layout unique in Canada.

Mr. Wilson, it may be here incidentally remarked, represents a third generation of coal miners in Canada. His grandfather sunk the shafts of the "New Winning" of the General Mining Association at Sydney Mines in 1867 and his father, Mr. W. R. Wilson, is General Manager of the Crow's Nest Pass Coal Co.

The notable feature of the Cassidy Colliery is the unusual provision for the comfort of the mine employees. Art has been used to beautify a site that is in itself beautiful and desirable, and after seeing Cassidy Mine, the average colliery official is divided in his mind between admiration at what has been achieved and regret that like provision has not been—and in some places unfortunately cannot be—made.

The Chairman believed that the care for its employees shown by the Granby Co. would, if generally adopted, markedly lower the cost of assessment for workmen's compensation.

Mr. Thomas Graham, General Superintendent of the Canadian Collieries (Dunsmuir) Ltd., said the Granby Company had set a pace for the East that would be hard to follow, a pace that only their large resources had made possible.

Mr. F. W. Gray said that to one coming from the collieries of Nova Scotia—where the mines were very far from being things of beauty—Mr. Wilson's paper had sounded like the Apocalyptic description of the City Beautiful. If, as Mr. Wilson had stated, the Cassidy Mine was the conception of Mr. F. M. Sylvester, the General Manager of the Cassidy plant, that gentleman was to be most heartily congratulated on the manner in which he had created such a practical exemplification of his theory that the mental and physical well-being of workmen is the secret of harmony between employer and employee.

COAL IN THE STATE OF WASHINGTON.

A paper on the "Future of Coal in Washington State" prepared by Mr. H. N. Freeman of Black Diamond, was read by Mr. H. H. Sanderson, of the Mines Safety Appliances Co. The title of this paper would appear to be a misnomer, it being chiefly descriptive of accepted methods used in mining and prospecting coal seams.

The Chairman asked Prof. Joseph Daniels of the University of Washington, to speak on the coal occurrences of that State, and at very short notice Mr. Daniels gave an incisive but quite comprehensive account of the known coal resources of Washington and of the unusually difficult and costly conditions attendant upon coal mining there.

The coal deposits extend from the International Boundary to the Cascade Mountains of Oregon, and are of Eocene age. The coal varies from sub-bituminous to anthracite. The term lignite as applied to Washington coals is probably erroneous. They contain a low percentage of moisture and do not disintegrate rapidly. They are not strictly to be classed with the lignites of the plains and the western provinces. The coal becomes more anthracitic as it approaches the Cascades. Its coking properties are apparently the result of metamorphism, and the anthracitic characteristics are presumably the result of extreme metamorphism.

Prospecting is difficult. The seams are hidden under a mantle of glacial drift and thick forest cover. Steep dips and faults and igneous intrusions make difficult problems in mining and development.

Most properties have been so far opened from water-level drifts where the seams have been exposed by watercourses, and there are but two shaft mines in the State. So far no deep mining has been carried on.

Retreating longwall has been used successfully, but in the main longwall has not been successful, because of the disturbed character of the seams. For the same reason the introduction of coal-cutting machinery has not made progress. Hand mining and shooting out of the solid are usual practice. Costs are naturally high—the highest of any State in the Union—because of the combination of physical difficulties and initial high wages.

The coal seams are dirty and the coal must be cleaned outside the mine. Practically all coal mined must be wasted. The percentage of wasted coal is larger than anywhere else. The lump coal percentage is small, and fines predominate. Annual output of the State is about 3¼ million tons.

B. C. Coal a Favourite Fuel.

Prof. Daniels referred to the appearance of head lines in the Seattle papers when announcing the arrival of Vancouver Island coal cargoes, and said the success of B.C. coal in the Washington market was due to its fine physical appearance.

Use of Pulverized Coal.

The meeting was especially interested in Prof. Daniel's remarks on the use of pulverized coal in Washington because of its bearing upon the similar problem of the use of pulverized lignites in the prairie provinces of Canada.

The Pacific Coast Coal Company of Seattle is now delivering pulverized coal in truck-load lots to consumers, which solves the problem of the user of pulverized coal who does not wish (or cannot afford) to install a pulverizing plant.

Automatic Under-Feed Stoker for Domestic Heating.

Another interesting statement made by Prof. Daniels was that under-feed stokers, with electrically-operated automatic feed—controlled by thermostat device—were being successfully tried out on the Pacific Coast for heating houses and buildings.

OIL POSSIBILITIES IN THE WEST.

Mr. D. B. Dowling, the Director of the Geological Survey, was listed on the programme to speak regarding "Oil Possibilities in Western Canada," but his address was much more comprehensive in its scope than the title promised, being, in fact, a lucid explanation of the geological history and present condition of the oil-bearing rocks of North America, which he said occurred in two well-defined horizons, one in the older rocks and one in rocks of Tertiary age. Mr. Dowling illustrated his remarks by lantern slides, which included some fine reproductions of relief maps.

"Crystalline rocks and sediments older than the oil formations constitute a large part of the sub-surface of Canada," said Mr. Dowling. He pointed out that the promising areas may be defined as including the less distributed strata lying between the Cordilleras and the Apallachians in the United States while beds not affected by ancient folding are found in the Tertiary beds in California. In the fractured zone of

the Atlantic Coast small areas of intense deformation are found that give a small measure of promise as possible oil fields but also suggest that the possibility of porous beds may have been lost.

"In New Brunswick and Nova Scotia oil shales and cannel coals occur that give promise of great value as oil producers," said the speaker, as he illustrated the territory by means of lantern slides. The Western Peninsula of Ontario has long been the principal producing oil field of Canada, but while the production is slowly decreasing, a close study of the underlying strata has suggested an expansion of the field. The region west of the lakes contains the most potential oil fields and is divided into two areas, the Central basin and the Northern basin.

In the Peace River district heavy oil has been obtained by boring, and in possibly the same measures out-cropping in the Athabaska river, where sands up to 200 feet in thickness are saturated with heavy asphaltic oil. There is also a small area in the southern part of Satkatchewan in which the oil horizon may be reached at elevations approaching or above sea levels. This area is suggested from the discovery in a deep boring in the vicinity of this anticline of heavy oil or asphalt in sands at the same horizon as in the northern field.

Most Promising Oil Reserve is Peace River District.

The most promising oil reserve in Canada was in this part of the Dominion, he said. It might be many years before those northern reserves were utilized, but it was a good thing to know that they were there. When the world's fuel supply began to decrease, Canada would be glad to know that this supply existed, even if it was "in cold storage." As for the problem of transporting it, Mr. Dowling declared this would be solved when the necessity arose.

Speaking of the Calgary field, Mr. Dowling said this area had produced 13,000 barrels of oil last year, which was of a high grade and was valued $100,000.

Oil Occurrences in Rocky Mountains Foothills.

In the distributed foothills confronting the Rocky Mountains narrow folds are frequently found, and these areas are small, but from one that has been prospected by boring, small flows of a very high grade oil have been obtained. Gas, which is derived from the same beds, is found to contain vapors of gasoline, and it is supposed that the accompanying oil is the condensation product.

There was no proof of the existence of strata on the coast here favoring the retention of oil, he said. He doubted if there was anything more than a few seepages. He told of a diamond drill hole having been made near here which went through a formation which would not hold oil. It would be a strange thing if oil was found here in commercial quantities, as there was no indication of there being an oil field here. Men who were trying to raise money for drilling had much to say about it but they kept away from the members of the geological department. That is where they made a mistake, because the members of this department were anxious to help everybody. "Tertiary beds are being examined in the Flathead Valley and at the mouth of the Fraser River. In the southern part of the Rocky Mountains bordering on Alberta seeps of oil, apparently from sediments of the Cambrian age, are being studied with a view to tracing the origin of the oil. Oil shales are found in the Queen Charlotte Islands, but their extent and value has not yet received much consideration. They are suggested as the origin of the oil found in basalts, which cut them."

DEAN BROCK ON THE PALESTINE EXPEDITION.

R. W. Brock, now Dean of the University of British Columbia, and attached to General Allenby's staff as a geologist with the rank of Major, described "Palestine and the Last Crusade" to a large audience in the ballroom of the Hotel Vancouver, in the evening of Wednesday.

Dean Brock was attached to the forces under General Allenby in the capacity of geological adviser. The Germans early in the war recognized the value of expert geological advice to their armies and in the west they employed forty geologists to the two that the English provided. Starting from a slide showing a cross section of Palestine from the coast across the trench of the Jordan Valley to the plateau of Moab, the speaker proceeded by means of a relief map of the country and a number of slides showing the character of the land in its different parts to give his audience an idea of the country over which Allenby had outwitted the German generals opposed to him, while the British forces had outfought the Turkish and German soldiers and brought about the crushing defeat of the enemy in September, 1918, that forced Turkey to her knees.

The lecture consisted of little more than brief explanatory remarks accompanying a remarkable series of photographic slides. These showed the country from the south of Jericho to the extreme north at Damascus. They included the scenes of the big battle when Allenby's cavalry out-flanked the enemy while the infantry, owing partly to the effect of the successful concealment of the plans and preliminary preparations for the advance but chiefly to the endurance and quality of the men who pushed forward eagerly during the intensest days of the hot weather, made the frontal attack that did not flag until Allenby was able to enter Jerusalem in triumph, with the Turkish army completely in his possession, men, transport, artillery and baggage, while another army with its communications cut, menaced by the Arabs in rear and the British on the flank, was endeavoring to extricate what it could from the disaster.

The Valley of Death.

Among the pictures was one of the famous "valley of death" where the retreating Turkish artillery and transport caught in the steeply banked Nablus road was shelled by our airmen until the cutting, which formed the only line of retreat left open, became one hideous shambles of wrecked guns, waggons and lorries, dead and dying men and horses; the spot where the greatest amount of carnage in the whole history of the war is believed to have taken place.

Speaking of the German occupation of Jerusalem, Major Brock told of the use by the Germans of the monastery on Mount Carmel as a fort. There was a monument on the mount in memory of some of Napoleon's soldiers which the Germans destroyed.

A clock tower had been erected at Jerusalem to commemorate the visit of the ex-kaiser. This, he believed, was not there now.

Early in the war the Germans had geologists working in Palestine and archeologists were working at a number of points. One of these Germans, a professor, made complete topographical maps of the entire country. The British had to get along with an old reconnaissance survey made by the late Lord (then Lieut.) Kitchener in 1879.

Searchlight on Tower.

The Germans had a hospice on the Mount of Olives. There was a tower on this in which there was a searchlight. The Germans had hospices at every strategical point in the country, each one similarly equipped, and one of which could contain more tourists than visited Palestine in a year.

Some of the German sisters at the Mount of Olives hospice offered to keep house for the British officers. This was done for some weeks, but the general had found it easier to keep his plans secret by moving.

The Egyptian native troops disappointed the Turks by their attitude. While they not be persuaded to fight the Turks they would not join them, keeping a neutral attitude.

When the enemy evacuated Jerusalem they gave out that they would soon be back. But the populace put more faith in certain prophecies that had been made. One of them was that Jerusalem would not be captured until a prophet came. As the population pronounced the name of Gen. Allenby, it meant, in their tongue "The Prophet." Another prophecy was that the city would not fail until Nile water flowed into it. Nile water flowed in through a British pipe line. The other prophecy was that a wealthy man would be appointed governor. The British appointed General Money governor.

MORNING SESSION, THURSDAY, 27th NOV

On Thursday morning the Chair was taken by Major Angus Davis, of the Dolly Varden Mine.

POSSIBILITIES FOR PLATINUM IN WESTERN CANADA.

Professor W. L. Uglow of the University of British Columbia spoke to the above-mentioned title.

"Platinum still continues to be a very scarce article, and has advanced from the fixed war price to the present one of about $130 per Troy ounce," said Professor Uglow. The largest producer of this precious metal was Russia, where in the Ural mountains the pre-war supply, had been about 300,-

600 ounces a year, but since the war this had greatly decreased. The United States is the second largest producer of this metal, and in 1917 the total output was 32,000 ounces, while Canada was running a close third, but this country had lost a lot of the credit on account of the fact that when the metal is discovered in the blistered copper from the Sudbury mines it is sent to the States, where it is refined.

"Native platinum has been found in various parts of Western Canada, chiefly in the Tulameen district of the Similkameen Mining Division, from which, during the year 1887-1891, an average annual output of 1500 ounces was recorded. It seems, therefore," said Professor Uglow, "on account of the present conditions of the platinum market, on account of our past production and because of the fairly wide distribution of platinum minerals in the west, that increased emphasis should be given to the possibilities of augmenting the Canadian output."

In dealing with the different metals in which platinum was found, the speaker told of a large number, mostly in Russia, Spain and Tasmania and on this continent. He stated that over 99 per cent of the world's supply of the metal was derived from placer deposits, and that all present information pointed to the increase of deposits in this way in the future. He related several instances in British Columbia where platinum had been found associated with dunite, which occurs in gravel and in river beds. In some other cases the presence of platinum has been located in quartz veins around Burnt Basin, B. C. Another method of getting platinum has been discovered recently by treating blistered copper sulphite ores and yet, in spite of the fact that the largest portion of the world's production is derived from placers and of the fact that Western Canada is noted for the occurrences of platiniferous gravels, it is worthy to note that the Canadian production of the metal is at present very largely derived from ores of the lode type.

In conclusion Professor Uglow that in view of the great possibilities there were three lines of attack to develop them. First, attention should be directed to those localities whose geology is similar to that in producing districts; second, the ground should be accurately tested in accordance with approved methods, and third, progress must be made in the matter of facilitating the recovery of platinum from lode ores and auriferous gravels.

He gave at some length the reports of many prominent mining engineers of the province regarding the possibilities, along with a number of figures to show the percentage of platinum that existed in the various ores.

Mr. Charles Camsell mentioned that a considerable platinum content in Sudbury ores was recovered in treatment in the United States which was not fully credited to Canada, and that the figures quoted by Prof. Uglow should actually be greater.

Mr. E. A. Haggen, Editor of the B.C. Mining and Engineering Record spoke of some possibility of recovery of platinum from placer black sands, and on occurrences of palladium.

Mr. Wm. E. Greenawalt's paper on the "Hydrometallurgy of Copper Sulphides" was read in the absence of the author.

Mr. E. P. Mathewson's paper on "Concentration of Copper Ores" was taken as read.

IMPROVEMENTS IN ORE CONCENTRATION AT THE TRAIL SMELTER.

Mr. A. W. Diamond, of the Canadian Consolidated Mining & Smelting Company, read a paper on "Recent Ore-Concentration Developments at Trail":

"The great advancement in the science of ore concentration by the oil flotation process in recent years naturally revives hopes in many cases for the successful treatment of ores by flotation which had formerly proved too refractory to the older gravity concentration methods and to the early undeveloped flotation process," said Mr. Diamond.

As examples of this process he told of the work of his company in developing low-grade gold ores of Rossland and the complex lead-zinc iron ore of Kimberley, B. C.

"During the first year efforts were directed chiefly towards the solution for gold ore and an experimental mill of 250 tons daily capacity was built and equipped with concentration machines which it was known would effect some separation and which it was hoped would successfully solve the treatment," continued the speaker.

Sullivan Ore.

In referring to the Sullivan ore, he explained that it was a finely crystalline complex mixture of lead, iron and zinc sulphides, carrying only three to six per cent insolubles. From a preliminary series of laboratory tests it was discovered that a good separation of zinc could be made from the lead and iron by flotation of the ground ore after it had been roasted at such a temperature as to almost completely oxidize the lead and iron sulphides, but to oxidize only a small percentage of the zinc sulphide. He pointed out that this roasting operation was commercially practicable and had been tested and proved a very valuable asset.

In dealing with the Rossland ores he pointed out that the concentration of the low grade ores had been given a great deal of attention and that they had been converted lately from an oil process into a simple gravity-table mill.

The flotation of the Rossland ores was again investigated by Mr. John Bray at Trail in 1917 with the results indicating that both flotation and cyanidation were necessary similar to those previously obtained at Rossland.

When the Sullivan concentration problem was fairly well solved, concentration of Rossland ores was investigated by the speaker and it was found from laboratory tests that good recoveries were obtained by a combination of flotation and tabling. The ratio of concentration, however, was such as to make the advisability of this treatment questionable.

"It is doubtful," he concluded, "whether this work would have to be continued had it not been for the fact that the original Sullivan experimental flotation mill was available and could fairly easily be adapted to the concentration of these ores. The mill was accordingly arranged with tables and flotation machines so that both, or flotation only, could be used. Before the completion in the changes in the table installation in this plant, operation was commenced with flotation only and from the outset as a high recovery was obtained thus as was obtained with both tables and flotation in the laboratory tests, and at the same time a much higher ratio of concentration was secured than if tables had been used.

"On completion of the table installation tests were made for periods of a few days each, using both treatment, but with no additional recovery and with a much lower concentration radio. Careful study of the flotation condition since that time has resulted in the securing of a still higher ratio of concentration by flotation alone, still maintaining as good or better recovery. Fortunately a mill installation for this treatment will be cheaper and more simple in operation. Plans are now being completed for a 1500-ton concentrator.

At a complimentary luncheon given by the Kiwanis Club to the members of the Institute, address were given by the Chinese Consul and Dr. McCallum of the Advisory Council.

AFTERNOON SESSION, THURS., 27th NOV.

Thursday afternoon's session, with Mr. Chas. Camsell in the chair, was notable for the very large attendance, the novelty and importance of the papers presented, and the keenness with which those present entered into the discussions. It would be hard to improve upon the "snappiness" of this meeting, and this was no fortuitous accident, but the result of much patient organization before the meetings.

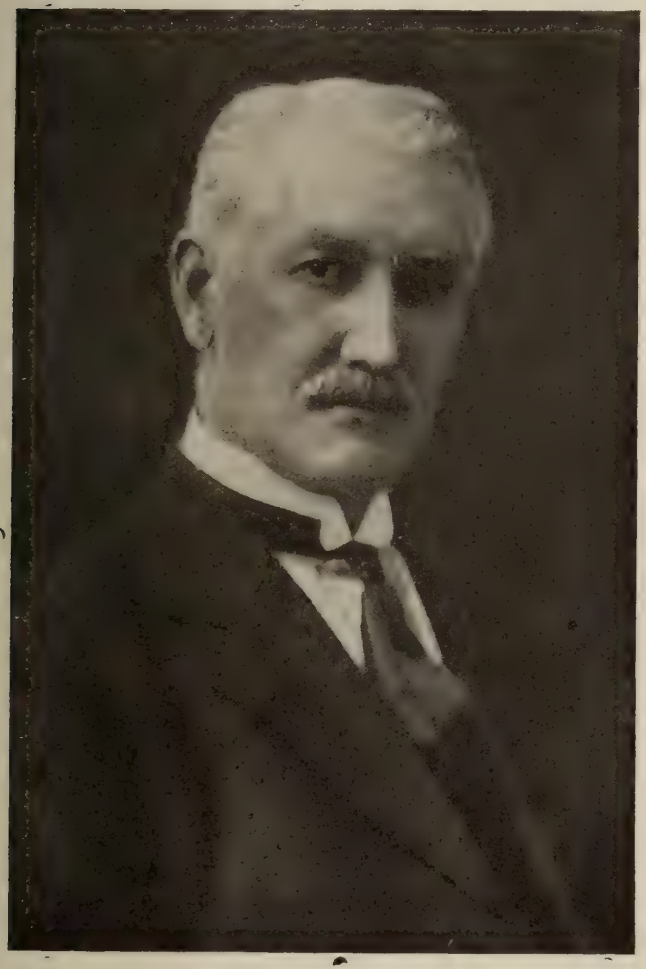
BY-PRODUCT COKE-OVENS AT ANYOX.

Mr. W. A. Williams' paper described the by-product coking plant of the Granby Company at Anyox, a description of which has already appeared in the "Journal." Mr. E. J. Conway read Mr. Williams' paper in his absence.

Mr. F. W. Gray said the Anyox plant was of unusual importance because it was the first large by-product installation on the Pacific slope. The bee-hive oven was rapidly falling into well-advised obsolence, and of much significance was the fact that in 1919, for the first time, the tonnage of by-product oven coke pro-

duced in the United States had exceeded the tonnage of beehive coke. The tendency of coke-oven practice in the East was to reduce the coking time and to lessen the width of the oven-chamber. Typical modern practice was 17 hour coking time and oven-chambers 17 inches or 18 inches wide.

Mr. W. R. Wilson of the Crow's Nest Pass Company, said the Anoyx plant had, of course, lessened the demand for coke from the Crow's Nest Mines. Mr. Wilson did not, however, dilate further on this point, turning his remarks much to the amusement of the meeting upon the beautiful colors of the Indian motive decorations of the "Totem Room" of the Hotel, and the general excellence of the climate and minerals of British Columbia.



MR. D. B. DOWLING.

THE DOLLY VARDEN MINE.

Major Angus Davis described the recent operation of the Dolly Varden Mine, which is located at Kitsault River, 17 miles above the point where it enters Alice Arm. Total shipments of ore from the mine, he said, amounted to about 6,500 tons of ore while the total silver production for this year to November 15 was 340,000 ounces. Shipments started last August and were the first to be made from this district.

The ore bodies were almost certainly of secondary origin. Owing to repeated faulting and cross-fissuring, mining operations had to be carried on with great care. The greatest depth obtained at present was under 300 feet. A lower tunnel was being driven this winter which would give an additional 230 feet. At or near the surface native silver occurred, in some places in extremely rich streaks, and lower down native silver, ruby silver, argentite and stephanite occur. About 270 feet from the surface ruby silver was the principal silver-bearing mineral. Fine-grain pyrites, carrying good silver values, also occurred in ore from the present bottom level up to the surface. Only higher grade ore was being shipped this year, the poorer ore being left always available when milling operations are possible.

THE STEWART DISTRICT.

Mr. E. E. Campbell, Mine Superintendent for the Granby Company at Anyox, gave a description of the Stewart District in Northern British Columbia. Mr. Campbell said in part:

For the past year no part of British Columbia has demanded more interest from a prospective mineral producing standpoint than that tributary to Stewart. About 10 years ago this place was the centre of a noted mining boom, and although at that time several properties of decided merit were found the district was more or less discredited by the foolish exploitation of a few properties of questionable value.

The interest now being taken in mine development in the Stewart district is based on many valuable discoveries of high-grade ore, and these cover such a wide area that the district as a whole cannot fail to be one of first importance.

Only that portion of the Stewart mineral area situated on the Salmon River will be discussed in this paper as it is in this part that many of the recent finds of rich ore have been made.

It has always been the opinion of geologists and engineers that the successful tenure of the mining industry in Northern British Columbia depend upon the development of primary ores of comparatively low metal tenure.

Due to heavy glaciation most of the oxidized portions of the outcropping ore bodies have been removed; the same

MR. THOMAS GRAHAM.

can be said of the surface-enriched zones, as few ore bodies on the north coast, on development, show definite evidence of surface enrichment.

Extensive Ore Bodies of Secondary Origin.

The recent discovery of extensive ore bodies carrying minerals that are unquestionably of secondary origin, establishes a reversal of the conditions thought to exist, as well as a change in the opinion of mining engineers regarding the types of ore to be encountered in the district.

Prospecting for minerals in northern latitudes has never been carried on as enthusiastically as in the districts further south, such as in California, Arizona and Mexico, due to the lack of rich surface ores. In these southern climates no glacial erosion occurred at the time the northern portion of the hemisphere was enveloped in ice which left that area free to the processes of oxidation and subsequent enrichment. This produced many rich surface ores which were eagerly sought for by the prospector, and when found could easily be turned to his credit.

The northern prospector generally had low-grade ore to deal with, the development of which usually entailed much capital, unless specially favored by location or other physical advantages.

The discovery of rich surface ores in the Stewart district has so stimulated prospecting that the final results to the prospector, mine operator, and the province should be manifold, and such discoveries should be an incentive to the further examination of other districts and the uncovering of new ore bodies

Edge of the Batholith Offers Greatest Promise.

A large part of the Coast range of British Columbia and the adjacent portion of Southeastern Alaska, is made up of granitoid rocks. These vast bodies of granite enclose, or are adjacent to, many scattered areas of sedimentary and numerous types of igneous rocks, and it is these areas flanking the granite mass that afford the greatest promise of reward to systematic prospecting. The Stewart mineral showings occur in one of these areas adjacent to the granite.

For the first five miles up the Salmon River from where it empties into the Portland Canal the country rock consists of granite. In contact with this is highly altered schist of apparently sedimentary origin. Beyond this is a vast area underloin by greenstone and tuffs, and it is in these rocks that the recent ore discoveries have been made. The greenstone, which is essentially a quartz porphyry, has been sheared and silicified in places, and it is in such zones that the ore occurs.

The greenstone in places is overlain by a volcanic brecchia, varying in texture from fine to coarse grained. This rock is generally grayish to green in color, and shows the same alterations as those found in the quartz porphyry. Where it is fine-grained and changed to the color of the greenstone it is almost impossible to classify accurately in the field.

The greenstones, or altered quartz porphyry containing the ore are part of a series of rocks, called by Mr. McConnell the Bear River formation. These greenstones vary widely in appearance, ranging from light green and almost normal quartz porphyry to a dark green and highly altered product.

Mineralization is confined largely to the greenstones, and is only present to a minor degree in the brecchia. On the Province claim of the big Missouri group an enormous development of the primary ore replacing the greenstone is exposed. On the Yellowstone group the ore occurs altogether withinin the breccia.

The Province outcrop covers an area on the surface of approximately 1,500 feet by 1,000 feet. The Yellowstone does not show such an area of mineralization as the breccia is not shattered or silicified to the same extent as the greenstone, and mineralization is confined to shear zones and fissures with much higher values, It is possible that this breccia layer is shallow, and that more extensive mineralization, with probable high-grade ore, is present in the underlying greenstone.

The primary ore in the district consists of disseminated sulphides in a schist gangue; sphalerite, galena, chalcopyrite and pyrite, carrying gold and silver.

Provided a substantial tonnage of ore is developed, the district offers no obstruction to successful mine equipment and development. The mineral area is from 12 to 20 miles from tidewater, and no great difficulties to railway construction exist. For an elevation up to 2,000 feet the hills are densely wooded with a good quantity of spruce, hemlock and cedar. Many thousand horse-power, continuous throughout the year, could be developed in Cascade Creek, which flows across the mineral area.

The district should prove of great attraction to the engineer. The ore is complex, and will require skill in its treatment. The rich ore can be smelted direct, but the low-grade offers a broad field for the exercise of the greatest ingenuity that the engineering profession affords.

Are the "Bonanza" Ores of Secondary Origin?

Following the papers read by Major Davis and Mr. Campbell, both of whom expressed a belief that the high- grade or bonanza ores of Northern British Columbia were of secondary origin, came an animated discussion, the question being evidently one of much interest to the British Columbia members.

It was mentioned that the Premier Mine was developed to a depth of 200 ft. in what was considered to be a zone of secondary enrichment and showed no lessening in values.

Prof. Turnbull agreed with Mr. Campbell that the rich ores were secondary, and that below there would be found primary ores of sufficient though lesser richness to give permanence to the district.

Mr. C. Camsell said geologists had always advised prospecting on the edge of the Coast Range batholith, which, in the Portland Canal District, is unusually exposed by the fiord. Remnants of stratified rocks exist within the batholith, which is by no means the solid and uninterrupted mass of granite that some maps would indicate.

Dr. Hodges said, evidently there were areas of rich secondary ores that had escaped the general glacial erosion. He believed that bonanza areas which had so escaped glaciation would be found in Northern British Columbia, in the Yukon and in Alaska.

The Chairman mentioned that some time ago a special investigation of the question of secondary ores had been undertaken by a committee of which Dr. Brock and Dr. Dolmage had been members, and as Dr. Dolmage was present he was asked to take part in the discussion.

Mr. Dolmage disagreed with the previous opinions expressed, and believed that British Columbia ores were of primary origin. They may be later in deposition, but this did not prove that their high values resulted from the processes of oxidation and surface enrichment. The presence of ruby silver, mentioned by Major Davis, was the strongest evidence of the probability of secondary enrichment that had transpired in the discussion, but a number of minerals formerly regarded as secondary are not now so classed. Bornite is an example. This mineral had been found at 1,700 feet below sea-level, and in the belief of the speaker, was a primary mineral.

Dr. Dolmage asked Mr. Campbell if he would elucidate his theory of how the rich ore-bearing areas escaped glacial erosion.

Mr. Campbell believed that the rich ore-bearing areas under discussion had—after undergoing a secondary enrichment—had been covered by breccia deposits of later age of deposition, which had been removed by glacial erosion that ceased before the underlying strata had been attacked, or at least, so attacked as to effect their total removal.

Mr. R. C. Wallace, Commissioner for Northern Manitoba said that in the undoubtedly primary rocks of that district, which had, as was well known, suffered extreme glaciation, the mineral calcocite had been encoun-

tered, a mineral that until recently had been generally accepted as a secondary mineral. This was one proof that the presence of certain minerals did not necessarily indicate secondary origin.

Mr. Fleet Rrobertson, the Provincial Mineralogist, said calcocite had been found at Aspen Grove, B.C., under conditions indicating primary origin.

NEW METHODS IN HYDROMETALLURGY OF GOLD AND SILVER.

The most notable announcement made at the Vancouver meeting was unquestionably contained in Mr. H. N. Freeman's address, who described a method by which, in the final processes of the recovery of gold and silver by cyaniding, metallic sodium was substituted for metallic zinc, thereby enabling the regeneration of the cyanide solution and preventing the losses occurring through the use of zinc precipitation.

Mr. Freeman said:

"The research work, leading up to the development of this process, about 1890, was carried out with the use of potassium cyanide, but in mining operations sodium cyanide now is used to the total exclusion of potash, which is far too costly and possesses no advantage whatever over sodium cyanide. One is inclined to believe that the present custom of cyanide mill operators to express the strength of their solutions in terms of potassium cyanide, when they are actually using sodium cyanide, is the result of propaganda to create a demand for German potash. Even sodium cyanide has been a costly chemical and many attemps have been made since the inception of the process to cheapen and facilitate its production in response to the demand from the mining industry."

"The most important constituent in cyanide is nitrogen, which occurs in limitless quantities in the atmosphere, but which is very difficult to bring into the combined state. The next important constituent in cyanide is the element, sodium, a metal somewhat costly to prepare.

"At the outbreak of the war, the major portion of the world's cyanide was obtained from Germany and it was there prepared by using metallic sodium, and nitrogen in the expensive form of an hydrous ammonia. Numerous attempts have been made in Germany to produce cyanide direct from atmospheric nitrogen but without producing a commercially successful product. However, much success had been realized there in manufacturing a commercial fertilizer from atmospheric nitrogen. This product, known as calcium cyanamid, was at the outbreak of war, produced on a large manufacturing scale in Canada. In Germany, several attempts had not been successful.

"The blockade of Germany and the consequent heavy demand of the South African mines upon the British source of supply, gave me a greater incentive to research upon this line. I may say that the research work, loading up to the manufacturing development of cyanide from calcium cyanamid, was carried out in Vancouver, in collaboration with the American Cyanamid Company of New York," added Mr. Freeman.

Canadian Plant Leads.

The Canadian plant of the American Cyanamid Company at Niagara is the first to produce cyanide commercially from atmospheric nitrogen by this process.

The greater part of the production of the plant at Niagara Falls, Ontario, has been used for the extraction of ore in Mexico, Canada and the western United States and for the fumigation of the citrus trees in California, notwithstanding the high cost of all-rail shipments from Canada.

The use of Sodium Lead Alloys in the Recovery of Gold and Silver from Cyanide Solutions.

In the second part of his address the speaker referred to the process of recovery of gold and silver from cyanide solutions in mills. There were two distinct steps: First, the bringing of the precious metals into solution, whereby they were reparated from the matrix, and second, the recovery of the metal from this solution. After reviewing the chemical process involved. Mr. Freeman, in conclusion, said that several methods had been developed for the production of the sodium-lead alloys requiring only ordinary salt as raw material.. For this purpose it was fused with lead in a small electric furnace. evolving bleaching powder as a by-product.

"Alloys of sodium and lead are very remarkable," he said. "Sodium is a much softer metal than lead, yet the addition of one or two per cent of sodium to lead results in an alloy hard enough for bearing metal. An alloy of lead and sodium containing ten per cent of sodium, is so brittle that it may readily be ground to a fine powder by hand with an ordinary mortar and pestle.

"In studying the chemistry of the gold cyanide solutions, it would seem that in order to recover the cyanide in the form which it would again be available for dissolving gold, the obvious thing would be to replace the gold with metallic sodium instead of metallic zinc. The objection to metallic sodium is that it decomposes water with explosive force and obviously it is impossible to use it as such for precipitating gold, but the employment of a sodium-lead alloy with only three per cent of sodium overcomes this difficulty.

Mr. Freeman explained that cyanide made in Canada contains a certain percentage of calcium chloride which acts as a colloidal congelant and gives a clear solution. It also contains a certain amount of caustic lime which adds a necessary alkalinity and is advantageous in treating ores containing small quantities of copper.

Mr. Fowler, in moving a vote of thanks to Mr. Freeman, said it was a long time since such a radical advance in metallurgical practice had been announced. Mr. Freeman's explanation of an intricate process had been very lucid. Mr. Hedley seconded the motion, which was carried with much applause.

In putting the motion, the Chairman said Mr. Freeman seemed to bring comfort to the distracted gold miner, and Mr. J. A. M. Dawson said Vancouver chemists thought a great deal of Mr. Freeman, taking great pride in the fact that he was a citizen of this city. Mr. Freeman had done work of great importance in discovering the new cyanide process, when the mines were cut off from the original source of supply. Local chemists were looking forward with a great deal of hope in connection with the work Mr. Freeman was carrying on.

THE SMOKER

One of the Vancouver newspapers said, not unkindly, and rather wittily, that the members of the Institute at the smoker on the Thursday evening, which, by the courtesy of the Terminal City Club, was held in its dining room, froliced "on the lower level," from which it would appear that the newspaperman was also an initiate.

The feature of the evening was the trial of Andy Larsen for a grave offence against a Canadian law which members of the Institute believe is honored more in its breach than by its observance. The verdict was that the defendant Mr. Larsen was not guilty, as "six bottles did not make a case," and in the opinion of the jury and the judge—a thirsty mortal—Mr. Larsen verged on becoming a public benefactor. The time-honored rendition of "Drill ye tarriers" was undertaken with disastrous effects. The fooling was excellent, but the fun was not quite so furious as on the night when a certain distinguished gentleman suggested two annual meetings before the general drought.

FRIDAY MORNING, NOVEMBER 28th

With Mr. E. E. Campbell in the chair, Mr. Paul Billingsley of Seattle spoke on—

GEOLOGICAL METHODS AS APPLIED AT BUTTE, MONT.

The speaker said that the Anaconda Company had developed its geological department into a very important branch of its organization, and this had resulted in a number of important factors. "The Butte ores are contained in rather narrow veins in granite. The common widths range from two to twenty feet," the speaker added.

In speaking of the early development, Mr. Billingsly said

that the first geological department was organized in 1900. Since then the work has advanced very rapidly, and has now reached a highly perfected state. The main object for the department has been to help the mine foreman and superintendents through a knowledge of the structure of the ground. As a result of 20 years' experiment it has come to regard the following points as essential: First, friendly cooperation and mutual respect between the mine foreman and geologists; second, prompt geological examination of all new workings in order that suggestions may be made without loss of time; third, accuracy in underground observation; fourth, immediate platting of notes and particularly of structural features upon general geologic maps and sections in order that new evidence may be studied in its proper relation to that already accumulated; fifth and last, a smooth working system whereby conclusions reached by a study of geologic data and translated properly into terms of mine operation.

"At present the members of the department cover about 6,000 feet of working each month," added the speaker. "Underground notes are taken on loose-leaf sheets on a scale suitable to the amount of detail desired. Generally, either 30 or 50 feet to the inch. Colored pencils are used."

Mr. Billingsley showed in coloured chalks upon the blackboard how the notes of the geologists were made intelligible, even after long lapse of time, and he emphasised, what was evidently very true, that the working out of these conventional markings had been carefully done, and was in fact most fundamental.

Dr. Hodge said geologists were very proud of the pioneer work at Butte, which had been a great vindication of their contentions. In answer to Dr. Hodge, Mr. Billingsley said that perhaps 85 per cent of the geological deductions prove to be correct in actual test by development work, and that they nearly always were able to find veins temporarily lost by faulting.

Mr. R. W. Brock said that geologists were themselves to blame for the small regard in which they had been held. They had made geology a high-brow subject, and had considered the application of their science to be derogatory. The Latin motto, which might be rendered "by thought and dint of hammer," contained excellet advice. Geology consisted largely in the careful accumulation of observations.

Mr. Brock regretted that so little attention had been found possible to paleontology and stratigraphy in Canada, particularly in reference to the coalfields. He said that the application of these two branches of geological science had added more to the economic value of the minerals of the United States than any other work undertaken by the U.S. Geological Survey.

Mr. F. W. Gray believed that geological writings were often unnecessarily technical and written so as not to be understandable by the ordinary person. Mr. Brock was a joint author of one of the few works in Canada on Economic Geology that could be read without a headache. The lack of application of paleontology and stratigraphy was noticeable in Nova Scotia, where, probably owing to the inadequate appropriations at the disposal of the Geological Survey, very little more was known regarding the paleontology, the correct horizon, or the correlation of the seams in the Sydney coalfield than was known in Richard Brown's time, about 1870. The application of geology to coal-mining in Canada had been greatly neglected. Mr. Billingsley's paper exemplified the saying that success lay in an infinite capacity for taking pains.

TAXATION OF GOLD MINES

Mr. Holler introduced this much debated subject by stating that the production of gold now was only 60 per cent of what it had been before the war, but that the use of gold now was ten million dollars more, as the jewellers were using great quantities of it. The question was mainly this, "How can men operate a gold mine at a narrow profit or even a loss when they are selling the gold to the arts profession at $20 an ounce, the same price as it has been for years?" asked Mr. Holler.

The only way to get relief, he said, was to get lower taxation and then many more mines could operate. In view of the fact that the arts were using so much gold why could they not be made to pay a tax on this gold and the money put into a fund to be used as a bonus for gold mines. Most of the gold was now shipped to the assay offices or the mint, where it was given to the manufacturers, and thus the collecting of the tax would be very simple. He then introduced the following resolution:

"That a committee be appointed to take up the matter with the provincial and Dominion authorities, and that the council of the Canadian Mining Institute appoint a live secretary and that all the finances be provided by the gold companies. Also that the committee consider the matter of a gold excise tax for all the gold used by the arts whereby they would have to pay $22, $23 or $24, or whatever amount was decided upon for each ounce of gold."

The necessity for some relief of gold mining from the present onerous conditions was generally voiced by the discussion which followed.

Mr. E. A. Haggen said that gold had depreciated 25 per cent per annum and that this question was purely an economic one and should be dealt with by statesmen. "The federal reserve board of the United States have taken steps to rectify this and have withdrawn a large amount of the money used in gambling on the stock exchange. During the war all the countries have been kite-flying and now they are trying to remedy the inflation of currency," he said. In speaking of the Victory Loan, he said that it had been done with patriotic intentions, but that the government had taken every dollar the people were willing to give and he thought this was not right. Lately the government had legislated that the banks could do all the kite-flying they wanted to and had issued a great deal more currency than they were supposed to.

Mr. James White, of the Commission of Conservation, pointed out that the suggestion made in the resolution submitted was economically unsound, and that to place a higher value upon gold—not matter what purpose it was used for—than the standard of gold value would have the result of taking all gold out of circulation and that precisely the same situation would be created that now faced the great powers through the advance of the price of silver to a point greater than the value of silver currency.

At the suggestion of the Chairman, the resolution was laid over for the consideration of the Resolutions Committee, who would frame a suitable formula for the consideration of the afternoon meetings.

Mr. H. N. Thompson of Vancouver read a paper on "Making the Hearth of a Matte Smelter Reverberatory Furnace," which drew an interesting talk from Mr. W. H. Jepp, an eminent Australian engineer, on methods in vogue in his country.

This concluded the morning session.

COMPLIMENTARY LUNCH FROM VANCOUVER BOARD OF TRADE

Mr. Chris Spencer took the chair at the luncheon tendered to Institute members by the Board of Trade,

Dean Milner Roberts of the College of Mines of the University of Washington, dealt at length with the conditions favouring the commencement of iron smelting in British Columbia. He was of the opinion that the Province contained sufficient iron ore, combined with fluxes, fireclays, and coal to make such a venture a success. Dean Roberts also pointed out how great was the preponderance of the produce of the mine in British Columbia revenues. He also said that the manufacture of iron and steel in the West would greatly assist the permanence of the shipbuilding industry there.

CONCLUDING SESSION, FRI. AFTERNOON.

Mr. R. C. Wallace, the Commissioner of Northern Manitoba, occupied the chair.

IRON AND STEEL INDUSTRY IN WESTERN CANADA

Mr. F. W. Gray, Secretary of the Iron & Steel Section of the Institute, and editor of the Canadian Mining Journal and Iron & Steel of Canada, explained that he had been asked to join in a discussion on the possibility of an iron and steel industry on the Coast and had not undertaken to speak to the title on the programme, which was hardly correct, inasmuch as there was as yet no iron and steel industry in the Canadian West, as the term is generally understood.

The speaker stated that all he could do was to review the evolution of the iron and steel plant in the East, and ask B. C. members to apply their own analogies.

The genesis of a successful iron and steel industry in Cape Breton Island came about through the presence of large deposits of coal, suitable for the manufacture of metallurgical coke, close to an excellent harbour, favourably situated with regard to world's markets, near large deposits of limestone and dolomite, and within easy transportation distance of the unique iron-ore deposit of Wabana, Newfoundland. It may here be remarked that even the people of the East have not quite grasped the valuable and illimitable character of the Wabana deposit.

Coal had been mined in Cape Breton for seventy years, but the industry was backward. Winters of idleness, and Summers of rush and hurry to obtain the largest possible outputs, made for unsatisfactory labour conditions, general instability and lack of progress. The resources of Cape Breton lay dormant until a man of vision in the person of Mr. B. F. Pearson collected facts and figures and presented them so convincingly as to interest Mr. H. M. Whitney, with whose advent into Cape Breton there commenced those consolidations of scattered coal properties and the influx of capital which made possible the coal and steel industry of Cape Breton as it exists to-day. Many undesirable happenings mark the Sydney "boom," but, whatever may have been the shortcomings of those days, the result has proved there is a legitimate place for the "entrepreneur," for the promoter of industrial enterprises who has vision and faith—but—before the promoter must come the careful compiler of commercial facts, who must demonstrate from the results of painful research and the slow accumulation of uninteresting but essential facts and figures that a sound basis exists upon which to found the projected industry. That the reward of the man who digs the foundation is often less than the reward of those who come after him seems to be one of life's ironies that must be accepted.

Steel Industry an Outgrowth of Coal.

The lesson taught by events in Cape Breton, and elsewhere, is that a steel industry is an outgrowth of the presence of coal.

The founders of the Cape Breton coal and steel industries appreciated the vital importance of transportation, and they provided large fleets of modern freighters.

Events have also showed that neither the steel companies nor the coal companies of Cape Breton are entirely self-supporting. One is the complement of the other. The underlying stability of the coal companies has enabled the steel companies to take advantage of periods of prosperity in the steel industry, the monetary results of which, in their turn, have greatly helped the coal companies.

"From the Ore to the Finished Ship."

The lesson that appears to be deducible from these gradual developments is that the most successful and permanent combination of industry is that of a associated industry of iron and steel manufacture, with steel-ship building, both based on large reserves of coal, iron ore and fluxes, having a suitable maritime location.

If actual events in the East seem to be foreshadowing the completion of such an evolution it should not be any matter for surprise, as such combinations have proved successful elsewhere.

In the application of this conclusion to British Columbian conditions, it is worthy of note that the technical conditions existing in Cape Breton were always most favourable, and such as might be expected to bring about cheap costs of operation. Nevertheless, the problems of the iron and steel industry have always been those of competitive markets and relative wages.

British Columbia has imperfectly known iron ore deposits, but sufficient is ascertained concerning these deposits to show that they are large and valuable. The maritime and strategic location exists on either the mainland coast or on Vancouver Island, but most important of all considerarions is the existence of coking coal on Vancouver Island.

The analogy between the relative position of the iron ore deposit of Wabana and Cape Breton Island, and the position of Vancouver Island to the known iron-ore deposits of British Columbia is very exact, even to the existence of large deposits of undersea coal on the ertxeme east and west coasts of Canada.

Fuel costs are basic in the iron and steel industries. The problem of iron smelting and steel manufacture is chiefly that of providing great heat heat supply at a low cost.

The possession of large deposits of coking coal of metallurgical grade is British Columbia's chief industrial asset.

Canada's Fuel Reserve Concentrated in the West.

It is questionable whether the people of the West realize the tremendous concentration of the fuel resources of Canada in the two western provinces of Alberta and British Columbia. The map which is attached to the Final Report of the Fuel Controller shows that Alberta alone contains more coal than all the rest of Canada put together, and also more coal than any single State in the American Union. The West also contains the greatest potential oil-reserve of North America.

Empire and national growth follow the possession (and the utilization) of coal, and where coal and iron exists by the side of the sea, wherever true British stock is to be found they must fulfil the maritime destiny of our associated Britisn peoples. It is the way of the race. The future of coal, iron and shipbuilding on the British Columbia coast is not a purely local question. It is far wider in its implications and impartial in its scope.

The considerations affecting a future iron and steel industry are primarily two, viz.,

a. Technical questions.

b. Economic and social questions.

Economic problems come first in importance. If a real necessity exists for the manufacture of iron and steel in British Columbia, the technical problems present no insuperable obstacle.

Dr. Stansfield's Report on the manufacture of pig-iron from B. C. magnetites by use of the electric furnace is full, complete and authoritative, but it must be borne in mind that Dr. Stansfield reported as a professor of metallurgy, on certain set questions, and not as a promoter, and that since his report was made the knowledge of B. C. iron ore resources has been enlarged. Dr. Stansfield's report is the document which will most interest capitalists with serious intentions.

The iron industry of British Columbia—which the future is quite likely to see—should not require aid from new and untried processes. It can, as Dr. Stansfield pointed out, be operated with complete technical success by using the ordinary and accepted methods of metallurgy which have been profitable employed elsewhere.

There is no necessity, and it would be a grave mistake, to be misled by unconfirmed reports of secret processes by which magnetite ore can be converted into steel by the electric furnace.

The economic problems resolve themselves into the question of a market. This should be made the subject of a careful statistical survey of local consumption of iron and steel, and the consumption in that territory over which a British Columbia plant could compete, which should include Alberta, the Yukon, Alaska, and the North-western States.

As to an export market, there would appear to be a good opening on the coast of South America, and while China will some day become the world's greatest producer of coal and iron, yet for the life of this generation, and maybe for fifty years, she should provide a market for pig-iron and steel products.

All these things will require to be compiled with exactness, and made ready for presentation to investors in a form suitable for study.

The social problems include the availability of suitable labour. An iron and steel industry requires a large number of unskilled labourers, and a smaller number of expert workmen, and there will be associated with the provision of these necessary workmen, large questions of transportation and housing.

There is another feature. Capital to-day is very timid, and it has reason to be. Before investors will find large sums of money for an iron or steel plant in British Columbia, substantial guarantees of safe investment must be given, and the social evolution of the province must include the fostering and protection of invested capital.

MR. F. M. SYLVESTER.

Things to be Avoided.

From the experience in the East the things which should be avoided in commencing an iron or steel industry include the following:

a. An unnecessarily large initial capital expenditure.

b. The establishment of a plant of a character too greatly in advance of local markets.

c. A plant of an unbalanced character, requiring orders representing a large tonnage of one product in order to keep running.

d. Too great reliance on subsidies. Subsidies while necessary perhaps in the initial stages of a new industry, should not be regarded as part of the permanent income of any enterprise.

These may seem elementary statements, but in the East they have been taught by painfully acquired experience.

In the discussion which followed, it was suggested that magnetite ores could not be smelted in a blast furnace, as a sufficiently high temperature could not be reached. The speaker said he knew of no difficulty in smelting magnetite ores in the blast furnace except increased cost and a greater expenditure of fuel when compared with more kindly ores. Prof. Daniels confirmed this statement.

Mr. Nicol Thompson intimated that British capitalists have satisfied themselves that the time is ripe for the establishment of a steel industry on the Pacific Coast, and thought it would be in British Columbia.

Mr. A. C. Gardie drew attention to the Copper River district in the North as it contained both ore and coal. If they could get a branch from the G.T.P. to bring out the material, a smelting plant might easily be established near Prince Rupert.

Mr. A. E. Haggen said if they wanted an industry established they should allow those interested to choose the most economical place to carry it on, no matter where it was in the province. Wilmot in his report had selected Union Bay, on Vancouver Island, as the most suitable place for all conditions, but failing that, he considered the vicinity of Vancouver as the next best location.

THE UNIONIZATION OF TECHNICAL MEN

Dr. William Turnbull described the formation and the objects of a number of societies in Britain and in the United States which had for their object the raising of the status of technical men, and the education of the general public to the claims of the technical men for consideration. He held that under present conditions technical experts were not rewarded by any means in proportion to the usefulness of their labors. Still, their first object was service, and they did not want to adopt the trade union method of forcing concessions if they could be obtained in other ways. Between service to others and self-interest, he believed they could find some medium if they could all come together. Speaking of criticism of the B.C. Technical Association, he said: "If it does not suit you, come in and make it suit you."

Dr. Turnbull's remarks were heartily endorsed by Mr. Matheson, the local chairman of the Engineering Institute of Canada.

RESOLUTIONS

The following resolutions, submitted by the Resolutions Committee, were carried, after each one had been thoroughly discussed.

With regard to the resolution of appreciation of the services of Mr. H. Mortimer Lamb, for fifteen years Secretary of the Institute, it should be mentioned that Mr. Lamb made a most fitting reply. It was evident that he felt most acutely the necessity to sever his active carrying out of the secretarial duties, which is enforced by ill-health. Mr. Lamb's best testimonial is the status of the Institute today, which is in large measure a monument to his assiduous work and careful guidance.

In passing this resolution, the Institute did itself no less honour than it gave to Mr. Lamb.

Resolution Regarding Returned Soldiers as Prospectors

"That the Canadian Mining Institute again urge that some suitable plan be provided by the government for aid in prospecting by returned soldiers and that the council take such steps as may be necessary to place the plan before the government in order that it may become operative during the summer of 1920."

Formation of Canadian Association of Engineers Favored

"That the formation of a Canadian Association of Engineers for purposes of social service, mutual protection and legislation is desirable and in the last interests of the public and the profession."

Taxation of Gold Mines and Platinum

"That the council of the Canadian Mining Institute appoint a committee of five to act in conjunction with a committee appointed by the B. C. Chamber of Mines and other committees which may be oppointed by other interested bodies for the purpose of collecting and arranging of data on the taxation of gold mines, and the presentation of this data along with recommendations regarding gold mine taxation to the British Columbia legislative assembly at the next session."

Unification of Mining Laws

"A further motion favored the unification of the mining laws of the various provinces of the Dominion, particularly insofar as they relate to the tenure of mining properties. This was carried unanimously."

Appreciation of Government's Policy in Forming Western Branches of the Geological Survey

"That the meeting place on record its appreciation of the policy of the Minister of Mines at Ottawa in organizing branches of the geological survey in British Columbia under Mr. Chas. Camsell, and in Alberta under Mr. Stewart, and expresses the conviction that this policy has been most beneficial to the development of the mineral resources of this province. That copies of this resolution be sent to the minister and officers in charge of the branches referred to.

Committee on Mining Machinery Tariffs to Confer with Minister of Finance

"A motion was carried favoring the importation of mining machinery free of duty, unless it could be shown that such machinery was made in Canada of a capacity and quality equal to that hitherto imported. A list of such machinery should be made in the presence of partise interested. so that they might have an opportunity of taking up the matter with any commission the Minister of Finance might appoint to deal with it.

Resolution of Appreciation of the Secretary

"That this meeting expresses its appreciation of the policy of the Council of the Canadian Mining Institute in arranging an annual meeting of members in Western Canada and takes advantage of this occasion to place on record its appreciation of the service which the secretary, Mr. Mortimer Lamb, during his fifteen years ... service, has rendered not only to the institute but to the mining industry of Canada as a whole.

Various resolutions of thanks to those who had organized the meeting, and to those public bodies and the Vancouver Hotel, which had afforded hospitality to the visiting members, were passed. Special mention should be made of Dr. Hodges, who was Managing Secretary of the Meeting, to whose energetic organizing is largely due the unqualified success of the meeting.

Especial appreciation was recorded of the manner in which the Vancouver newspapers had reported the proceedings of the meeting. No more accurate and generous account of the proceedings of a technical society have ever been given by metropolitan papers in Canada, and the thanks of the meeting to the newspapermen was in every way deserved.

With the passing of the foreging resolutions the meeting finished its proceedings.

THE BANQUET

Notable as the guests of the Canadian Mining Institute at its annual dinners have been in the past, the Institute never was more signally honored than by the presence at the Vancouver dinner of General Sir Arthur Currie, who was accurately introduced to the members by Mr. Fowler, the Chairman as "Canada's greatest soldier."

General Currie said he felt at home at a dinner of the Institute, and the he was reminded of a dinner held

MR. R. C. WALLACE.

by Institute members in France, presided over by Col John Penhale, and which was ended, as the custom called for, by the singing of "Drill ye tarriers" led by "Foghorn" Macdonald.

The General paid a remarkable tribute to Major Angus Davis, and spoke at length regarding the work of the tunnelling companies in France. He honored the assembled guests by relating some of the less well-known phases of the war.

During his remarks General Currie said the he had been quoted as being in favor of compulsory training, but he said that he was rather in favor of universal training. "The lesson taught by the war was the folly of unpreparedness, and if the policy had been right in the first place I don't believe the war would have taken place. The men who have come back would not have the

same cause for their dissatisfaction, for they went away at the call of the country when she was in danger, and they returned to find men who did not go and who had paid off their mortgages by means of the prosperity they acquired and are now going about in automobiles and with the soldiers' girls. They have good reason to be dissatisfied," said the speaker amid applause. "If the proper steps had been taken at the start of the war we would not have the present unrest and the lack of preparation is directly attributable to this dissatisfaction. I am one who believe in the League of Nations as a help to the peace of the world. I would like to see the lesons of the war carried out and a system by which people would get the worth of their money and enable them to play a part in the British Empire adopted. If Canada is to remain a part of the Empire she must play her part, and if she is not prepared to do this she had better drop out," added Sir Arthur.

Other speeches were made by the Minister of Mines, the Hon. William Sloan, by Senator Bostock, Mr. H. B. Stevens, M.P., and Major Brock.

this had not ben taken advantages of, it would mean that on a 300-ton plant approximately $675 a day, or about $213,975 a year.

On the report of Dr. A. Stansfield, of McGill University it was found that the manufacture of high-class pig iron from the magnetites of the province by the electro-thermic method was in every way possible. Following the publication of this report, there had been many enquiries and the speaker said that New York investors were now considering the launching of an iron and steel industry. If water power could be secured at a reduced rate from that quoted in Mr. Stansfield's report, he had no doubt but that something would be done and done soon.

Mr. Sloan declared that personally he believed that there was room for a 250 to 300-ton plant in British Columbia now, the local market, apart from British Columbia's unrivalled position on the Coast, giving an uninterrupted and direct water connection.

In his closing, remarks the minister dealt with the employment of aliens in the mines, saying that the large mining companies of the province had shown a disposition to view the position from the proper angle. He said in part:

Returned Men First.

"They recognize that, for the most part, the natural wealth of the province must be developed for the benefit of the country and this can not be realized if British subjects, our Canadian boys who fought so nobly in Europe and have returned, are to be discriminated against in favor of Oriental or other alien labor. I feel, very strongly on this question. I feel that the time has come when we must take a definite stand, when we must formulate a policy that will forbid this kind of thing and from which we shall not deviate. We would be failing our returned men, on a question the right and wrong of which is clearly marked, if we permitted the employment of aliens in places that can and must be filled by men of our own race?"

Hon. WM. SLOAN, Minister of Mines for British Columbia.
Getting into touch with his constituency.

SPEECH OF THE MINISTER OF MINES

The Chairman introduced Mr. Sloan as "a real Minister of Mines," a dictum in which the guests appear to quite concur. Mr. Sloan spoke at length and with much grasp of the mining problems of the Province, which he has inspected at first hand during his term of office.

The Iron Ore Resources.

Speaking of the iron and steel industry in this province, Mr. Sloan informed his audience that the iron ores of the province were not confined entirely to the magnetites of the Coast, as this had been disproved by the discovery of a large deposit of hematite and limonite in the Whitewater basin, Bridge River, of the Lillooet district. The ore in this section consisted at a rough estimate according to the Provincial Government engineer, Mr. Brewer, of 50,000,000 tons of high-class quality. As soon as weather permitted the Dominion Government would send in Mr. Scholfield of the Dominion Government geological survey to determine the available ore in the new field.

Action Taken by B. C. Government to Encourage an Iron and Steel Industry.

The first step taken by the Provincial Government, the speaker said to develop the iron and steel industry was on his recommendation, the offering of a bonus of $3 per pound on all pig-iron manufactured in the province from local ore. While

Demand for Silver.

Pointing out that the more valuable the mineral or metal, the smaller in proportion became the freight as the case of gold and, in a lesser degree, silver, Mr. Sloan drew attention to the unprecedented demand for silver and the great opportunity that this situation presented to British Columbia. This province contained large, rich, undeveloped silver deposits which, with the metal at its present price, say $1.20 an ounce, would pay good returns on capital invested.

"Among the many strange changes brought about by the war has been the wonderful increase in the value of silver," he said, "until to-day it has almost reached the sixteen-to-one parity with gold, and prominent economists assure us that the parity of $1.30 an ounce is about assured for about at least five years to come, based on the inexorable law of supply and demand. Thus, what was refused by the law of nations have been effected by the war of nations, and what the silver producer hoped for in 1875 has been handed him in

1919, and this applies particularly to the present silver miners of British Columbia. I would advice them to produce to the limit."

The general opinion that British Columbia silver was almost exclusively produced from the galena (silver lead) ores was characterized by the speaker as incorrect, as the statistics of his department for 1918, showed that about 26 per cent of British Columbia silver was derived from copper areas carrying silver, so that his appeal was directed not only to the operator in galena, but as well to the copper operator.

"Just one more glance at figures before passing from this subject," said Mr. Sloan. "Records show that British Columbia's silver production in 1918 was 3,498,172 ounces. Now this proves that we have a long way to go if we get the share which this province should have of that 463,000,000 ounces for which the world will be looking for every year for some time and which, at the present rate of output is unobtainable. Now mark you the silver producers of the world are going after that market. The deficit must be made up from new fields which have been little developed, and where can there be found a country with greater potentialities in this respect than British Columbia."

Provincial Output.

He pointed out that Canada's silver production in 1918 was 21,284,607 ounces, so that despite the riches of the province, it contributed a comparatively small proportion to the total. So that he could not be accused of being unappreciative of what was being done in development work in the province, Mr. Sloan pointed out the work that was under way in East and West Kootenay, in the Boundary country, in the Salmon River section of the Portland Canal district, as well as at Alice Arm. The development at the Premier mine he predicted would mean much for British Columbia. The Canadian Consolidated Mining and Smelting Company had announced its intention to establish a large concentration fill, probably at Rossland, and at Copper Mountain the Canada Copper Company was completing an exceedingly large development programme.

Silent Toast to the Late Capt. LeRoy

Major Brock, addressing his remarks to General Currie, paid an eloquent tribute to the late Capt. LeRoy, a devoted member of the C. M. Institute, who was, said Major Brock, "the finest company leader I have ever known." At Major Brock's request, the assembled company rose and drank a silent toast to Capt. LeRoy's memory, and the memory of those members of the Institute who also will not return from the Great War.

The dinner ended by some excellent fooling. Major Brock introduced himself as the President of the Pacific Coast Maritime Gold Recovery Company, Limited, explaining that he and his associates had discovered that the sodium atom contained 1,002 molecules, and by knocking off three molecules, they obtained gold — which the speaker gravely informed the meeting, had 999 molecules. By utilising the illimitable sodium content of the oceans the shareholders might hope for large financial returns. And so forth. The guests were duly impressed, and some of them are not yet quite sure whether there was not really something in the scheme. It would not be surprising to find that the reported discovery of the transmutation of metals by Dr. Rutherford is a rumor reflected from this little "stunt" of the grave and reverend seignors of the C. M. I.

Major Brock did his best to emulate "Foghorn" in leading the singing of the C. M. I. anthem, and his rendition of the word "perspoire" was worthy of County Cork. In view of the presence of ladies, Major Brock, with his well-know versatility, fittingly modified the reference to—well—shall we say, the protuberances of Hades!

So ended a gathering that was, as its promoters intended it should, successful and worth while in every way.—F. W. G.

REGISTRATIONS AT THE VANCOUVER MEETING OF THE CANADIAN MINING INSTITUTE.

Anderson, R. G., Mining Student, Fairview, B. C.
Armstrong, E. E., Mining, Parkerville, B. C.
Ayland, C. R., Mining Student, Victoria, B. C.
Anderson, R. G., Mining Student, Fairview, B. C.
Armstrong, W. H., Coal, Calgary, Alta.
Archibald, E., Giant Powder, Traveller.
Austin, P. H., Can. Expl., 913 Birks Building.
Bain, A. S., Mgr. E. G. Prior & Co., Winch Building.
Bonar, Robert, Mining, Wellington, Vancouver Island.
Beel, H. G., Mining Student, Powell River, B. C.
Beatty, T. J., Miner, 14 Broadway, East.
Bell, W. S., Mining, Keefers, B. C.
Banfield, W. P., Mining Student, 644 Bute Street.
Bower, G. Mining, 25-11th Avenue, West.
Breeze, Frank J., Miner, Stewart, B. C.
Broughton, F. W., Mining and Assaying Student, Golden, B.C.
Beiltz, E. D., Mining Student.
Bajus, R. J., Student and Assayer.
Bristol, C. F., Mechanical Engr., Sharon, Ont.
Bacon, W. S., Mining Engr., 402-207 Hasting, W.
Banks, E. G., Waihi Gold Mines, New Zealand.
Bonnycastle, W. R., Hydro Electric Engr., Vancouver, B. C.
Bullard, R., Mining Engr., 1570-11th West, Vancouver, B. C.
Bruce, R. R., Mining, Windermere.
Banks, C. A., Mining Engr., 5 Nelson Court, City, 3-Albans Rd. London, England.
Carter, B. C., Mining Student, Lulu Island.
Cartwright, C. E., Civil Engineer, 445 Granville.
Clarke, T. A., Mining, 124 Broadway, West.
Creelman, A. G., Contractor and Mine Owner, 1675 Laurier.
Clowes, T. M., Mining Attorney, Mackenzie River Basin.
Cameron, Alex., Mining, Barkerville, B. C., and Dawson, Y.T.
Corwin, T. J., Mining, Merritt, B. C.
Carleton, P. Browning, Gen. Supt. Britannia Beach.
Campbell, Stuart C., Mining Broker, 1215 Standard Bank Bldg.
Campbell-Johnson, R. C., Mining Engineer, Vancouver, B. C.
Cagney, A. S., Engineer, Montreal (represents A. S. Peacock).
Carry, Henry E. C., Civil Engineer, 1306 Cardero Street.
Cartwell, F. E., Gen. Supply Co. of Canada, 736 Granville St.
Cowan, Wm. Lbrman, Hotel Abbotsford.
Creet, A. D., Civil Engineer, 409 Credit Foncier Building.
Cue, T. G., Mining, Cue, Australia.
Cunliffe, J., Coal Engineer, Burnaby, B. C.
Comrie, Z. H., Assayer, University.
Conway, E J., Anyox, B. C., Mining Engineer.
Campbell, E. C., Mining Engineer, Anyox, B. C.
Campbell, C. R., Mining Engineer, Phoenix.
Camsell, C., Geol. Survey Canada, Vancouver B. C.
Duff-Stuart, Col. J., Mining, Seymour Street.
Dolmage, V., Geol. Surv. Canada, Vancouver, B. C.
Dickson, Jas., Inspr. of Mines, Victoria, B. C.
Daniels, Joseph, University of Washington, Seattle.
Davidson, R., Mining Student, University.
Davidson, J. R., Publicity Comm., 402 Pender West.
Dixon, G. B., Mining Student, Vernon, B. C
Dowling, D. B., Geol. Survey, Ottawa.
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Dawson J. A. (D.), Mining Chemist. 326 Howe Street.
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Drummond, L. E., Mining Engineer, Edmonton, Alta.
Eilbeck, Mining (Sheriff), Dawson, Y. T.
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Emmons, R. C., Student, B. C. University, Vancouver.
Fowler, T. T., Mining Engineer, Riondel, B. C.
Fitzherbert, C. H., Mining Engineer, care of Edwards Ames, Vancouver, B. C.
Falker, J., Mining, 1433 Barclay, Princess Royal Island
Foley, M. L., Mining, Hotel Vancouver.
Fiddes, Robert, Mining, 159 Hastings, East.
Floyd, Edward, Engineer, Hillcrest, Nanaimo.
Freeland, P. B., Mining Engineer, Grand Forks.
Faulds, Alex., Mining Engineer, 626 Hastings.
Gold, Thomas, Mercury Miner, Cadboro Bay, B. C.
Garde, A. C., Mining Engineer, Prince Rupert, B. C.
Gill, J. E., Mining Student, Rivers Inlet, B. C.
Graham, Chas., Mining Engineer, Cumberland, B. C.
Graham, Joseph, Man. Dr. Fleeming Coal Co., Merritt, B. C.
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Hamilton, Col. Douglas, Consulting Engineer 2254-2nd, West.
Grimmett, M. L., Mining Man, Mayor, Merritt, B. C.
G. A. Gillis, M. E., University.
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Gardiner, C. S., Mining Student.
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Graham, Mining Inspector, Cumberland.
Heidman, H. W., Mining, Anyox, B. C.
Hooper, John, Mining, Barkerville, B. C.
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Harris, H. A., Nugget Mine, Salmo, B. C.
Hunt, W. V., Engineer, 510 Hastings, West.
Hobart, Roy, Giant Powder, 704, 602 Hastings, West.
Herring, J. P., Arthur M., Mining, 609 Queens Ave., New Westminster.
Harsant, R. C. C., Mining, Granby, 718 Granville Street.
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Hogger, E. A., Editor Mining Review, 426 Homer St. Vancouver.
Holler, F. W., Mining, Surf Inlet.
Honeyman, P. D. I., Mining Student, Sechelt, B. C.
Hedley, R. R., M. E., Nicola, B. C.
Heyer, B. E., Journalist, Vancouver
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James, H. I., Mining Student, New Westminster.
Jackson, J. A., Mining Student, Abbotsford, B. C.
Kilburn, G., Mining Engineer, Victoria.
Keen, J. P., M.E., Roseberry, B. C.
Kingham, J. R., Mining Student, Victoria, B. C.
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Kerr, John, Mining Broker, 584 Richards.
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MacKinnon, Donald, Mine Owner, Dawson, 725, Broughton St.
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McKee, G. L., Inst. High Speed Steel Co., Rockaway, N. J.
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Langley, A. G., M.E., Revelstoke.
Lang, T. J., Student Assayor, Vancouver, Gen. Hospital.
Lambert, N D. Mining Student, Princeton.
Law, Chas, E., Mining, Athabasca River.
McKechnie, D. C., Student Mbr., Lillooet.
MacDonald, A. J., Contractor, 614 Douglas Lodge.
McCallum, Dr. A. B., Chairman, Advisory Council Industrial Scientific Research, Ottawa, Ontario.
Martin, Duncan, Mining, Commercial Hotel, Seymour Inlet.
McQueen, D. W., Mining Student, Rossland, B. C.
Moody, H. R., Mining, Golden, B. C.
Moncton, C. F., Mining, Royal Oak, Victoria.
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Morrison, W. M., M.E., Tacoma, Wash.
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Lamb, Mortimer H. Secretary C. M. I., Montreal.
Naismith, S. J., Taylor, England.
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Roberts, Milner (Dean), Seattle, Wash.
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Roscoe, H. M., M.E., Anyox, B. C.
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Rand, Arthur E., Mining Broker, New Westminster.
Shannon, William, Mining, Flack Block.
Starling, R. R., M.E., Nanaimo, B. C. (send Paper).
Sawford, Frank, Taylor, England.
Sweatt, R. C., Taylor, England.
Scott, L. R., Taylor, England.
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Twelves, Claude F. H., Assayer Student, Golden, B. C.
Thompson, D. L., Mining Student, Brittania, Ont.
Turnbull, J. M., Prof. Mineralogy, University.
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Vaughan, Robert, Metallurgical Engineer, Trail, B. C.
Wallace, R. C., Govt., Le Pas, Man.
Winkler, Geo., M.E., Victoria.
Wells, F. M., Mining, Surf Inlet, B. C.
Woodworth, J. B., Mining, Thornley Park, B. C.
Woodworth, Kenneth D., M.E., 22nd and Collingwood.
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Wilbur, J. W., Logging and Mining, 808 Hastings St., West.
Wilson, W. C. H., Mining Acct., Victoria.
Wilson, W. R., Gen. Mgr. V. P., Crows Nest Pass Co., Fernie, B. C.
Wilson, Thomas, Con. Cyanding Engineer, 330 Dunsmuir Rhodesia, S A.
Walkers, J., M.B., Yale, B. C.
Wood,, Wentworth R., M.E., Kamloops.
Wilson, R. R., Granby Cp., Cassidy, B. C.
Wilson, A. G., Mining, Nelson.
White, Jas., Conservation Dept., Ottawa.
Whittaker, D. E., Gov. Analyst, Victoria.
Whiteside, A. M., Barrister, 470 Granville Street.
Weart, J. F., Mining Student, Britannia Beach.
Waters, B. C. (Bidwell), 601, 718 Granville Street.
Wagnel, Geo. (E. & M. J.), New York.
Wright, P. W., M.E., Seattle.
Young, Mayor D.D., Taylor, England.
Young, Wm., M.E., 1004, 501 Hastings, West.
Archabald, H. B., Consulting Engr. Mining Mach'y, 334 Seymour Street, City.
Anderson, S., University, Rossland.
Austin, Elliott J., M.E., Box. 1184, Nelson.
Berkeley, C., Chemist, Viological St'n, Nanaimo.
Bodine, H. E., M.E., 207 Hastings, West, Beatrice Mine.
Buchanan, Supervisor, Zinc Bounties, Kaslo. B. C.
Crocker, S. J., Mining Mach., 602 Hastings, West.

Roof Control in Coal Mines

By JAMES ASHWORTH.

(Continued from page 904, issue 3 Dec. 1919.)

Mr. Rice has apparently concluded that "bump phenomena" are not related to gas outbursts, but result from the rigidity of the overlying rocks and the great weight of cover, and because the whole of the coal has not been taken out all the way from the outcrop, so as to allow the rocks to break down in successive slices". He has also "assumed" that the latest bumps were the result of "improper mining in 1907-1908 of the lower mine, viz., No. 2. In regard to Mr. Rice's report, the author of these notes would comment as follows. At the time of the "bumps" in No. 2, these were attributed to too small pillars having been left to support the roof and therefore it is probably correct to infer, that this is the IMPROPER mining referred to by Mr. Rice. Now if, as has been stated, the roof in No. 2 mine had in 1908 forced the small PILLARS into the pavement, and filled with fallen rock the spaces from which the coal had been extracted, the assumption of improper mining does not appear to have been proved (see Mr. Shanks paper on Bumps, C. Mining Institute Bulletin.) The great object of safe coal mining is, after extracting the coal, to make the roof fall and to bring it into close contact with the floor. The area in question was worked out earlier than 1908, and therefore it is not apparent or proved that the overlying strata up to No. 1 East of say 90 feet or less had not settled and compacted the roof in nine years, and if it had not, the fact would have been demonstrated in No. 1 East mine as soon as that area was reached. It has moreover been observed, that wherever No. 2 mine has been worked on the longwall system there have been no serious bumps, whereas under M. Rice's agument as to "improper" mining the results ought to have been worse than with so called pillars.

Mr. Rice's suggested "cure" for the bump malady is to drive six parallel roadways into the mine, three for the intake air and three for the return airways, and when these have been driven and only one fifteenth of the coal extracted, (only one fourth was extracted before), then the real getting of coal is to commence per haps five miles perhaps ten miles inbye. There is no statement as to where this extraction is to commence nor is there any descripion as to how this extraction is to be safely accomplished.

The erection of very large ventilating fans, watering the roadways, double burned flue dust explosion barriers, electric safety lamps, etc. are in the category of prevention against firedamp explosions, which have never yet occurred from any recorded bump.

The question of profitable working is not directly taken into account, and therefore in view of the restrictions, it is possible that the working of the coal may incur a loss possibly in excess of its sale value, especially when a further cost is added for 100 feet bore holes in the face of every heading, seismographs etc., etc. The reason why such long bore holes should be suggested is not apparent, as high gas pressure is not given as one of the factors in the production of bumps, neither have bore holes been found to be an effective protection to mines which have produced notable outbursts of gas, excepting in one case known to the writer, where the outbursts were from the floor and the floor was drilled to an underlying coal.

The special difficulties to be overcome in the Crows Nest Pass coalfield are in the summary stated to be,— "Unusual natural difficulties; coal is under heavy load; coal beds very gaseous; "bumps" not related to gas outbursts; overlying rocks are very rigid and there is a great weight of cover; too much coal extracted in advance mining; or not taken out completely from the outcrop; which would break the overlying rock in slices and prevent "bumps".

"Bumps" are believed to be caused by subsidence of roof in certain areas under rigid rocks, leaving a great unsupported span of rock stratum. Fig 6.

When one of these has given way it means the hammer like blow of thousands of tons of rock striking on the immediate roof or flexible stratum overlying the mine, which in its turn imparts the blow downwards, breaking timber, causing extensive falls in the mine and sending rock tremors through the strata."

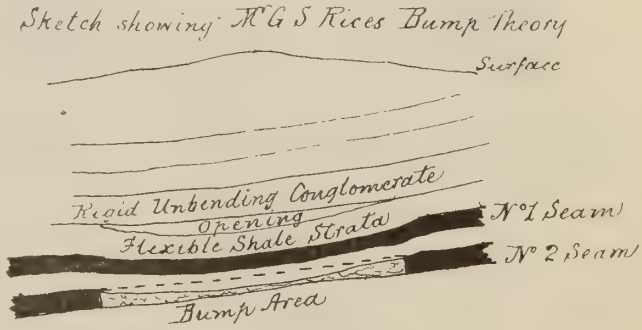


Fig. 6.

Mr. G. S. Rice's "Summary" was accompanied by "An Outline of Policy Adopted to Date by the Department of Mines",—in which it was announced that seismographs would be established to give warning of possible earth tremors. In reference to experimental methods of mining the coal the following method was to be adopted in No. 1 mine East, "A large pillar of solid ground will be left to support the bump area. Main entries will be driven through the temporary prohibited area, and driven on until a selected boundary is reached, when retreat will begin.....Under this plan less than 15% of the coal would be extracted in the advance."

To increase the safety of the mine as now at work and also in the future, the "rash" and "top coal" on the haulage and air ways is to be stripped down to "remove the danger of men being smothered by falls of this material simultaneously with bumps".

"In the gathering of samples of gas—the analyses have proved that the Crows Nest Pass Coal Field is the most gaseous field in the world."

The Gas Yield,—"—The gas flow in the mines is not so much from the breaking of the coal at the face but is largely governed by the area of the face exposed, so that it may be expected that the larger these mines

are made and numerous pillars standing, even though the tonnage actually produced daily may be small, yet large quantities of gas may be generated".

Gas Testing Machines,—the Department selected the Burrell Gas Detector which will detect from one tenth of one per cent up to three per cent.

It has since been discovered and accepted by the Department that a one quarter inch cap shown by the Wolf safety lamp represents 2½ per cent of Methane and indicates the point of danger at which the miners must be withdrawn. The necessity for this important decision of the Department of Mines for British Columbia has often been referred to by the present writer in his reports, because in past time the firebosses have had no rule to guide them, and have either reported "a little gas" or "small cap of gas" and infrequently "explosive gas," but there was no statutory "danger point".

Other points are also referred to but they do not affect the question of "Roof Control" to the same extent as do emissions of explosive gases, and need not therefore be discussed here.

Outstanding conclusions in Mr. Rice's report.

After reading the quotations, which are a little condensed as above, we find certain outstanding points, (1), that "Bumps" are not related to outbursts of explosive gases; (2), that "Bumps" are believed to be caused by the subsidence of roof under rigid rocks; which later break down in great masses; (3) that improper mining in No. 2 mine caused the bumps in No. 1 mine, why improper not explained; (4) bumps may recur over the same area; (5), new operations will take out not more than 15% of the whole seam in No. I East mine; (6) bore holes to be made to give warning of impending outbursts of gas; (7), well kept airways and powerful fans to be added; (8), a permanent commission to further investigate and review, —the following points (a), topographical survey, including surface cracks; (b), Seismographs, to give warning of earth movements; (c), carry on experimental work on methods of mining coal especially No. I bed; (d), to gather samples of gas, ascertain amount of and now held; (e), to continue to take samples of mine air for chemical test; (f), to drill long bore holes the practical effect of which would be to determine the rate at which it would be wise to allow the entries to advance, (g), the question of methane flow and pressure which is going to be of an increasingly serious nature in all the mines; (h), appointment of a Commissioner to determine how the collieries are to be laid out; (i), tunnels may be required six, eight, or ten miles in length. (G. S. Rice up to this point.

Recommendations in the Rice Report adopted by Dept. of Mines.

The Department of Mines agrees to (a), (b), (c), and states how this is to be carried out; but "when the seams are adapted to longwall mining, it is contemplated using this method of mining". (d), have proved that, the gas flow "is largely governed by the area of face exposed".....the larger these mines are made and numerous pillars standing, even though the tonnage may be small, yet large quantities of gas may be generated"; (j), have adopted a gas testing machine to detect small per centages of methane; (k), Edison Electric safety lamps, larger fans, intakes and returns for each mine; (i), double burned ashes and watering to be applied to neutralize explosive conditions of the dust;—also rock dust barriers;—(m), has fixed a standard gas cap as the withdrawal point for miners; (n), that an interval of four hours should elapse between shifts; (this is now in force).

The "nether roof" not mentioned in departmental reports.

In summing up the foregoing notes on roof control, and the present position of the most important detail of the safe working of coal mines in the Fernie district of British Columbia, it is necessary to call attention to the fact that in no case has the "nether" roof been referred to, and it has apparently been assumed that the "roof" to be considered extends from the coal seam to the surface. If it were so, then the timbering in the mine must be assumed to be strong enough to resist the pressure of the whole thickness of the strata up to the surface, and not up to the "nether" roof only. In this connection it would appear that it is not definitely known to what height the roof movements extended when the workings were carried out on the longwall method of extraction. It is however necessary to ascertain the height at which this nether roof is operative especially in the No. 1 mine east at Coal Creek, when deciding on the size of the pillars to be left in the first working. As the matter now stands we are told that 85 per cent. of the whole coal seam is left in pillars to provide against "bumps". This again would lead us to conclude that the height of the nether roof is calculated to reach up to the ground surface.

In the case of No. 2 mine, and the so called "improper working of this mine (see Mr. Rice's report) has a pronounced effect on the No. 1 East mine above, it seems fair to assume that No. 1 East mine formed the nether roof for No. 2 mine, and therefore as the long wall method of working the latter mine has never produced any serious bumps, nor in any way injured the No. 1 East mine above, it would seem to be proved that it is a better and safer method of extracting the coal than any pillar and stall method of extraction depending on the size of the pillars.

Both mines have at times suffered from serious bumps, but only when worked on the pillar and stall system, consequently as shown by past experience No. 1 mine East would be less subject to bumps if it were worked on a modified long wall system by which 85 per cent of the coal might be extracted in the first working, and 15 per cent lost in small abandoned pillars which would easily crush and let down the roof.

Influence of Faults in causing "Bumps".

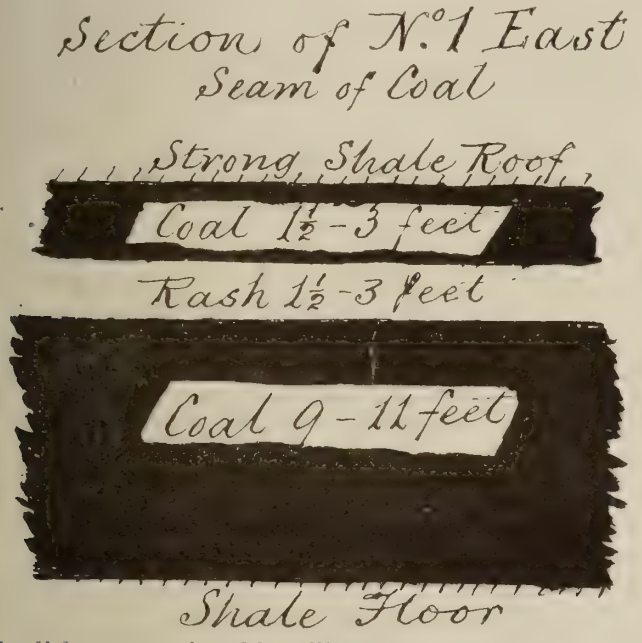
There is moreover another factor which has received no attention whatever, and which has probably more influence on bumps than any other factor in the problem, and that is faults. Thus, in No. 1 East mine there is a fault with a south west to east north east direction and crossing the creek is also found in old No. 1 mine. On the south side of the creek this faulting brings up the No. 2 mine to the level of No. 1 East; and in Nos. 2 and 3 mines, which are really the same seam, there is a fault about a mile inbye which runs in a northwesterly direction and joins the first fault referred to. Part of this fault line appears on the plan exhibit No. 4 marked "crumpled area", see Minister of Mines Report for 1917.

The influence of this faulting was more clearly demonstrated on the north side of the creek in old No. 1 mine, which corresponds with No. 1 East, here the

east north east fault was on the eastern side of the workings, a crumpled zone was on the north side, the outcrop of the same seam on the west side and an open side to the Creek on the south side of its workings. It is not surprising therefore to find that a break in the mountain took place from east to west and extended right up to the surface, and put an end to the bumps on that side of the Creek.

Possible effect of Rigid bed of Conglomerate above No. 1 Seam.

There is also another factor which requires to be taken into consideration, viz, a thick bed of Conglomerate above No. 1 mine. Doubtless this has an important influence on the breakage of the strata above the coal if bumps are to be prevented, which in plain



English means that big pillars are a danger, because they prevent the roof breaking down in regular sequence as the coal is worked. When the roof breaks down in regular sequence the pressure on the coal seam is reduced and it is in its safest condition.

Emission of Firedamp.

As this article is on roof control the writer does not propose to consider the question of the production of firedamp in detail but as it has been proved that this is in proportion to the area of the exposed surface of the coal, it follows that the small pillar or no pillars at all will reduce the surface exposed per ton of coal extracted, and consequently reduce the volume of firedamp per ton, which has been stated to be equal to one ton of firedamp per 20 tons of coal gotten.

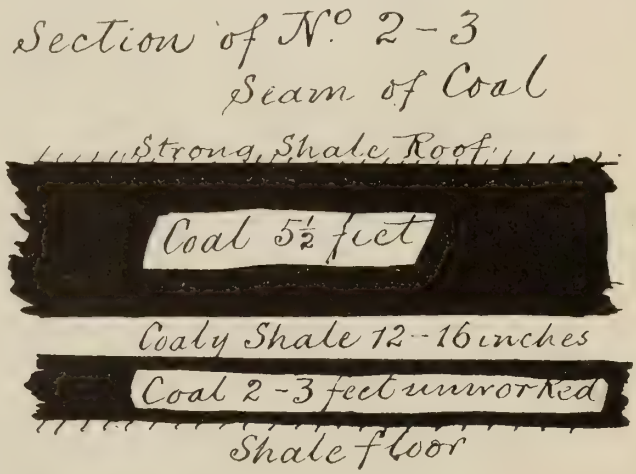
As regards the influence of occluded gas the evidence so far collected appears to prove that its pressure in the solid coal is not sufficient to add in any way to the mechanical effect of roof bumps, but it may have an influence where the bump is demonstrated by the lifting of the floor, as detailed in some of the occurrences at Coal Creek in No. 2 mine.

Hydraulic method of stowing the Goaf.

Roof control when considered as a means of avoiding the danger from bumps, would not be in any sense complete without a reference to the hydraulic method of stowing the goaf. This is in practical every day use at many colleries where thick seams are being worked and with great success, as it may be applied to any method of working, and leave no goaves to fill, and remain filled with gas. In the Crows Nest Pass coalfield there would however be a part of the year when the intense frost might render its application difficult.

At the Dalzell Colliery in Scoland hydraulic stowage has been in regular use since 1911. Its adoption has rendered the safe working of the mines possible and practicable and nullified the risk due to the possible breakage of the roof strata which would bring down an influx of water.

In working a mine like the No. 1 East at Coal Creek, which in the official reports is classed as the most dangerous or gassy mine in the world, the importance of goaf stowage cannot be too earnestly considered, because even with the "approved" method of working set out in some detail in the British Columbia Minister of Mines Report, the area of surface of ex-



posed coal increases every day. This adds daily to the risks by requiring increased volume of air to sweep away the gas or reduce it down to say one per cent of methane in the main returns, and the goaf areas become reservoirs of either methane or firedamp. The approved plan shows no panel sections in the mine, and therefore a disaster in one district cannot be isolated from the rest of the mine.

Appointment of Commission Advocated.

Both the Premier and the Minister of Mines of the British Columbia Government have promised to appoint a Commission or Commissions to enquire into various questions affecting the safety of these mines in particular, but for some reason not publicly known this much to be desired enquiry has not yet commenced, —neither were there any additions bearing on this subject made to the 1911 Mines Regulation Act when the Act was revised in 1919.

For some length of time the miners have insisted on working only one coal-getting shift in each 24 hours, instead of two coal-getting, and one repairing shift, but it does not appear that this has lessened in any way the liability of the mine to "bumps", and so far as the emission of gas is concerned the reports, so far made public, do not how any material difference in the volume found in the main return air courses, and therefore it seems very desirable to have the opinion of a competent Commission at as early a date as possible.

(Concluded.)

Freeman, Horace, C.E., Hornby Street.
Fountain, D. F., Mining Student, Vernon, B. C.
Geff, Herbert W., Gen. Mgr. Electrolytic Zinc Co of Australia Company, Melbourne and Hobard, Collins House, Melbourne.
Gernaey, H. M. C., Mussens, Ltd., Vancouver.
Gillis, Frank R., Mgr. Ballard Drop Forge Co., 47th and Cc-Clary Street, Pt. Grey.
Gorman, R. A., Can. Expl., City.
Hill, Richard F., M.E., Ladysmith Smelter, Seattle.
Huyck, C. B., Mussens, Ltd., Vancouver.
Johnston, W. J., Civil Engineer, Vancouver.
Jones, Alfred A., Broker, 918-510 Hastings, West.
McConnell, J. P., Mining and Journalist, Barkerville.
McMorris, W. G., Mining, Nelson.
Mackensie, J. D., Geol. Survey, Esquimalt Mil'ty Hospital.
Murry, C. W., M.E., 1110-6th Ave, New Westminster.
Payne, W. R., Mining Student, U. B. C.
Roylands, H. J Machinery, 910-207 Hastings, West.
Savage, J. M., Coal, Victoria, B. C.
Simpson, Dr. H. A., Mine Owner, Vancouver.
Spinstin, T. A., Ladysmith, B. C.
Hone, C. E., Mining Student, U. B. C.
Todd, V. H., Granby Company.
Wallbridge, A. H., Broker, Homer Street.
Webb, Civil Engineer, Vancouver.
Wilson, Chas. A., Mining, St. Catharines, Ont.
Williamson, A. S., Jones Lake Copper, M.E., North Vancauver, B. C.

NOTES FROM THE FAR NORTHWEST

Yukon-Mayo District

120 applications have been forwarded to the Gold Commissioner's office at Dawson covering claims staked in Keno Hill. The claims are scattered all over the hill for a distance of four to eight miles. It is likely others have been staked within the area, but have not been forwarded from Mayo by the recorder owing to the infrequency of the mail.

Snows came early on Keno Hill and few cared to go into the region after snow started to fall. Again it would be impossible for a stranger to find his way about and to avoid staking over tops of other claims.

Within the last week or two many grants have been issued to men who staked claims on Keno and Extension during the summer and fall.

Large Hydraulic Plant Proposed for Tibet Creek, Alaska

Mr. George Adams, who has just gone South to Seattle, has been operating on Tibet Creek with two No. 6 Giants. The location is 107 miles Northeast of Telegraph Creek.

Hydraulic operations on this property are operated under most favorable natural conditions, with 400 feet head pressure and an unlimited supply of water. 600 feet o fduming ground is afforded by Tibet Creek Valley.

With 13 one-half mile leases, Mr. Adams is preparing four distinct hydraulic plants on the property, each using two No. 6 Giants. This will make the largest hydraulic plant on the Continent.

$100,000 Cash for Pioneer Mine, B. C.

The Mining Corporation of Canada has purchased the Pioneer Mine at Cadwallader Creek, Lillooet, near the Pacific Great Eastern Railway. This announcement was made by Mr. W. R. P. Parker, Vice-President of the Corporation.

Development will begin on an enlarged basis. The Pioneer was sold by Adolphus Williams, K.C., and the two Ferguson Bros., who have owned and operated the mine for two years past. Considerable gold was taken out by them.

The Mining Corporation of Canada are becoming active in British Columbia. They at present have a proposition at Barkerville where they are developing some properties on the Mother Lode.

With engineers in many parts of the world Vice-President Parker's only regret is that they did not turn their attention to British Columbia much earlier.

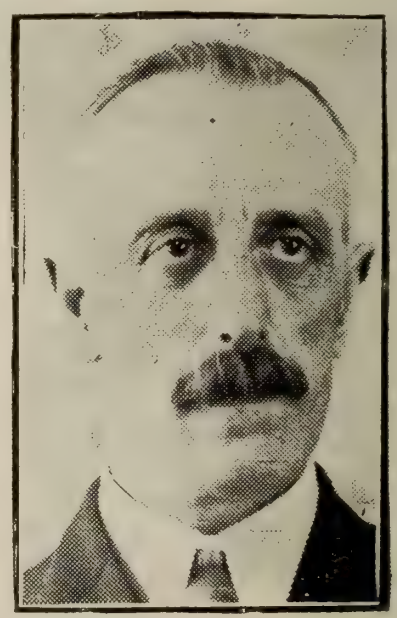
PORT ARTHUR NOTES

By J. J. O'CONNOR.

Port Arthur is not likely to suffer any inconvenience through the coal strike. The fuel situation at the lake front here is about normal. It is estimated that there is sufficient fuel on hand to meet all requirements, for railway, commercial and domestic purposes.

Importations of anthracite to Nov. 1st were 349,789 tons, as against 251,210 tons for the corresponding period in 1918. In storage here on Nov. 1st, 139,800 tons, on the same date last year there was 86,100 tons in store. The western movement has been greater than last season, so that it is expected that the quantity on hand on December 1st will be about the same as last year.

News of the contemplated division of the Department of Lands, Forests and Mines, and the creation of a separate Department of Mines, was most favourably received in this portion of the province. It is felt by all those who know him, that the Hon. Harry Mills, the new head of the Department, will do justice to the position, and that Ontario's great wealth in gold, silver, copper, nickle, iron and all of the non-metallic minerals, are worthy of a separate Department, to which the Minister's whole attention may be devoted, something that hitherto was impossible, that, given the attention the Hon. Mr. Mills is certain to apply to it, the portfolio of Mines will soon rank as one of the first in the Cabinet, and that Ontario's premier industry will come into its own.



HON. H. MILLS.

There is probably not sufficient anthracite on hand to supply all demands, but if shortage occurs, it may be easily made up by an increased use of bituminous coal.

The imports of the latter, to Nov. 1st were 396,427 tons, as against 288,419 tons to the same date in 1918. This refers to commercial coal only, and does not include railway fuel.

L. L. Stevens, M.E., and L. V. Stevens, M.E., of New York, spent about a fortnight in the examination and study of geological formations in this district. They covered a considerable portion of the older mining areas, and have become so interested in their investigations that it is their intention to return at an early date, and pursue this work.

The Lake of the Woods gold area is about to experience a revival of gold mining. The Mikado Mine, at Shoal Lake, has been sold to Chicago interests, headed by Robert Wachman, and will be put under operation at an early date. Some of the most spectacular gold ever seen in the northern country, was taken out of the early workings of this mine some years ago. The new owners are confident, that, with the improved methods now in use, for the recovery of values, they will be enabled to make the mine a good producer.

The Grace Gold Mine, and the Norwalk gold property, situated in the Michipicoten gold area, six miles from the Algoma Central Railway, have been sold to W. A. Burmeister, of Chicago, for $80,000 cash. Both these properties are now under active operations, with a full equipment of men and plant.

The Foley Mine.—Another of the old-time gold properties of the Lake of the Woods gold region is about to be revived, and the activities of the late '90s repeated on a more modern and extensive scale. The improved methods, now in use, for the recovery of values, make it possible to operate mines at a profit today, that some years ago, could only be operated at a loss. The saving of values effected by the methods of today, more than offset the increased cost of labour, and all materials that enter into the problem of mining.

The "Foley Mine" situated on Shoal Lake, six miles south of the Canadian National Railway, (has been purchased by the Swedish-Canadian Gold Mining Co., Ltd., represented by J. A. Johson. The "Foley" comprises 191 acres, on which some thirty veins have been located. The company have also taken over several other mineral lands in North Western Ontario, and now own 955 acres in all.

The Swedish-Canadian Gold Mining Co. is capitalised at $3,000,000 and has $1,500,000 in the treasury.

There is a 20 stamp Fraser & Chalmers mill on the property, in good condition, together with camps and other necessary buildings to accommodate a staff of one hundred miners. The work of constructing an aerial tramway 1,600 feet in length, to convey the ore from the shaft to the mill, will be commenced Jan. 15th, 1920.

Two shafts have been sunk, 200 and 420 feet respectively. The 200 foot shaft will be used as a central shaft. Active mining operations will begin Jan. 15th. A drift will be run from the 200 foot shaft to connect with the 420 foot shaft, 1,200 feet to the north, this drift will be on the vein, which has an average width of 8 feet.

A cyaniding plant will be installed that will effect a saving of 95 per cent of values, as against 55 per cent under the old operations.

This property has been examined and reported on by such well known mining engineers and geologists as the following: Walter G. Cole, Horace V. Winchell, mining geologist, Fredick Gleason Corning, E.M., J. H. Chewett, M.E., R. A. Kerr, M.E., J. A. Wood, and E. P. Rathbone, E.M., all of whom make favourable reports on the property, giving values, averaging from $9,45 per ton, to $24.00 per ton, on the various veins.

From 75 to 100 miners will be employed, under the superintendence of Mr. J. A. Johnson.

A good waggon road, with nominal grades, runs from the railway to the mine, on the south, it has water communication with Fort Frances, 42 miles to the westward. In the vicinity, there is ample water power for all mining purposes, of easy access and development.

TORONTO NOTES

Dr. M. Y. Williams on Oil Prospects in Northern Ontario

That oil exists in Canada's northland and that the indications are very promising is the conviction of Dr. M. Y. Williams of the Canadian Geological Survey, who has spent some time investigating the possibilities, and who is now preparing a report which will be published by the Ontario Department of Mines. The only public reference so far made to the oil discoveries is in a souvenir booklet prepared in connection with the visit of the Prince of Wales to the Cobalt district in which Dr. Williams gives some indication of the line his report will take. In an article dealing with the resources of the north the booklet says: "At some time in the not very distant future it is probable that the Temiskaming and Northern Ontario Railway will be extended to James Bay. In that event further mineral fields will become readily accessible. Fifty miles north of the Transcontinental Railway on the Mattagami River an extensive deposit of excellent fire and china clay has been located. Farther north there are prospective oil-bearing formations." Dr. Williams summarises his conclusions as follows:—

"Two formations known to occur south of Moose Factory may contain oil. These are the "Corniferous" limestone and the "Salina Shales." The rock structure is favorable. The Salina Shale is fairly deeply buried over considerable areas and probably retains any oil which it may originally have held. The "Corniferous" limestone is mainly stripped of its shale cover excepting over small areas where the shale occurs, principally in synclines, in structure not favorable for oil. Drilling in suitable areas alone can give final results. Black Huron shales occur near the foot of the Long Rapids on the Abitibi River. Thin beds of green clay shale occur in the black shale and some highly calcareous beds also occur. The latter are in part petroliferous. Samples of the oil shale have been submitted for examination but the results have not yet been reported."

Toronto People Interested in Radium Claims in Butt Township

The Mining Corporation of Canada have taken an option from Rinaldo McConnel on 74 acres of land in the Township of Butt, on the west side of Algonquin Park. The ultimate price is $10,000, of which $1,000 has been paid down. This property adjoins the large holdings of the Elliot Syndicate of Chicago, on which pitchblende and ore of radium have been discovered. The Bureau of Mines has reported that this ore is much richer in radium than any hitherto found in the United States. A number of Toronto people have also secured property in Butt. One of the largest holders is R. B. Rankin, of the Standard Bank Building. He and his associates have altogether 300 acres adjoining that on which the recent find has been made.

Canadian-American Resources, Limited—An Incorporation with Authorized Capital of Fifty Million Dollars

M. G. Hunt, barrister, Toronto, has announced the formation and incorporation in Ontario of a large concern known as the Canadian-American Resources, Limited, with an authorized capital of $50,000,000. Both Canadian and American capitalists are interested, and it was stated that developments and production in mining and oil was anticipated on both sides of the line. Already some properties in the United States are in view awaiting action by the new organization, but nothing definite has been secured in Canada as yet. It is expected that attention on this side the line, will centre chiefly in Northern Ontario. Engineers will be available to promptly investigate properties, and it is anticipated that operations will be carried on on a large scale. "It is the intention of the officers of the company," said Mr. Hunt, "to acquire only properties of value and have them operated by the company itself. The company will be equipped to carry on its own refining processes." The officers of the company are: President, Alexander Alexander, New York, President of the National Gum and Mica Company, and connected with several other large corporations; Vice-President, L. E. Denyes of Toronto, director of a number of corporations; Secretary, Dr. R. Gordon Bogart of Kingston, Ont., prominent in several Canadian industrial concerns; Treasurer, George B. Leighton, New York, President Lone Star Shipbuilding Company; directors, Col. Jacob Ruppert, New York financier and sportsman; George B. Gifford, for thirty years connected with the Standard Oil Company of New Jersey and manager of refining corporations; S. W. Jenckes, Sherbrooke, Que., a manufacturer with interests there and at St. Catharines.

Our Northern Ontario Letter

The quotation for silver has reached a point where the silver content of the silver coinage of Canada and the United States exceeds the face value of the piece. Between the silver coinage of these two countries and the melting pot is but one obstacle—the law. In the exercise of this, the writer believes, special legislation is necessary. It was at least found to be necessary in such countries as France, and finally in the British Isles.

Early in November your correspondent, in reviewing the opinion of metal authorities at the points of distribution, as well as the views of the silver producers, pointed out the advisability of anticipating a continued upward swing in quotations. As to this, however, the authorities at Ottawa appear to be letting matters drift. At the time of writing, the same is true of the United States.

The fact is that today the silver currency of these two countries is threatened with wholesale mutilation, and the governments appear to have failed to even warn the unscrupulous against such practice. As a result, a condition exists which might well cause a more or less rapid diminution of silver currency.

Silver is scarce, the price is high. Silver coins are flowing freely, they contain greater silver content than their face value. What may a great many silversmiths throughout this continent be expected to do?

Should quotations continue to advance, we may witness in Canada and the United States a great dearth and small change, and, perhaps, then witness the spectacle of the government bringing down legislation to suppress an evil that has already caused great inconvenience and much actual loss.

As a result of the high price of silver, and expectation of long-continued demand the scope of operations in the silver-bearing districts of Northern Ontario have taken on proportions greater than since production in Cobalt was at its maximum and the outlying districts were enjoying their short-lived boom.

So far this year some thirty mines in Cobalt have contributed to the output. Two Gowganda mines shipped ore, and one from South Lorrain. The indications appear to be that this total of 33 shippers so far this year will be added to somewhat in 1920. Not only is this indicated by the present activity and success in the Gowganda field, but may also prove to be true in Cobalt where some new small operations are commencing and where others are under contemplation.

According to recent advices, the Nipissing mine now has a surplus of some $4,300,000, which is the highest in the company's history. Despite a decade and a half as a leading producer and having paid dividends approximating close to $20,000,000, the Nipissing continues to produce at the rate of close to $5,000,000 a year, and holds unchallenged the position of being the largest silver producing mine in the British Empire.

The negotiations between the Northern Customs Concentrator and the Chambers-Ferland, as mentioned recently in these columns, resulted successfully, the former company purchasing 25 acres of the Chambers-Ferland (lying to the east side of the railway.) The price is stated to have been in the vicinity of $200,000.

J. P. Bickell, president of the Temiskamig Mining Company, paid a recent visit to the company's Cobalt mine, where considerable high grade ore is being de-

veloped. The physical condition of the mine is now such as to encourage the belief that dividend disbursements may be resumed at an early date. The treasury contains close to $1,000,000.

The Beaver Consolidated continues to encounter substantial quantities of high grade ore. In this connection President F. L. Culver has issued the following statement:—

BEAVER.—Since mailing the annual report to the shareholders, we have had strenuous times in the North Country. The spirit of unrest, which is dominant throughout the world, has not escaped the North, and in the Cobalt Camp work was suspended for a period of seven weeks on account of labor difficulties. However, these difficulties have been satisfactorily adjusted, and operations were resumed about September 9th. Recently we have made discoveries of rich, high grade ore, which are most important—on the 200-, the 600-, and on the 700-foot levels. On the 200-foot level, working from a little slip, we found a vein carrying very rich ore running parallel to a drift which was very productive in the early days. As yet we have not determined the extent of this vein; assays, however, give us values as high as 4,000 ounces to the ton. On the 600-foot level a shoot of high-grade ore was encountered, which seems to be an off-shoot of one of the old ore-bearing veins. Work will soon be started to intercept this at the 700-foot level. On the 700-foot level on the No. 3 vein system we have encountered high-grade ore which has been opened up for a distance of 120 feet. This ore will run between 2,000 and 2,500 ounces to the ton. On the No. 5 vein system on the 700-foot level we have recently discovered a new shoot of ore in virgin ground which we have opened up for a distance of one place, about 10 feet long and 3½ inches wide, the ore is about 40 feet. The vein is carrying good high-grade, and at estimated to run 10,000 ounces to the ton. This ore body has yet to be developed both above and below the 700-foot level. Since resuming operations we have shipped 79 tons of silver ore.

KIRKLAND LAKE.—At the property of the Kirkland Lake Gold Mining Company, in which the Beaver is so largely interested, labor conditions forced the suspensions of operations for a period of about 18 weeks, from June 12th to October 15th. When work was suspended the stopes on the 400-foot level were filled with ore ready for the mill. On the 500-foot level we had been changing the grade since resuming; have this work completed, and are putting in chutes and breaking stopes. No stoping has been done on the 600- and 700-foot levels, although both drifts are in excellent ore, which is being raised to the mill. As soon as the drifts are carried a little farther, stopes will be broken in both of these levels. In future all ore between the shafts will be trammed on the 5th level, which will greatly reduce our operating costs. The mill is now operating at full capacity, treating 150 tons a day. Scarcity of good miners is hampering our underground operations somewhat, and we are forced to supplement the tonnage from the underground by raising from the surface dump. However, we believe it will not be long before our underground operations will be on a much larger scale.

A new company has been incorporated, known as the Hargraves Consolidated, for the purpose of taking over the old Hargraves and the Reliance, both properties situated in the Kerr Lake section of the Cobalt camp. A plan of operation is stated to be under consideration. The new company has an authorized capital of $2,500,000 made up of 2,500,000 shares of the par value of $1.00 each and with 1,800,000 shares issued.

The McKinley-Darragh has declared a regular 3 per cent dividend, payable January 1st. The disbursement will amount to $67,428 and will make to total paid to date amount to $5,686,735.

Diamond drilling operations have commenced on the Adanac property, one machine being employed to drive a horizontal hole. The machine is working from a cross-cut at the 310 ft. level, the hole being drilled for the purpose of exploring the territory adjacent to the Gans property of the Temiskaming Mining Company. Other underground operations on the Adanac have been suspended.

Underground mining operations will shortly be under way at the Peterson Lake property, part of the workings having already been de-watered. On the part of the directorate and management there is manifest a tendency to regard the old Seneca lease as likely to yield further revenue. They point to the fact that at the time the rich Seneca vein was mined, a substantial quantity of low grade ore may have been passed up owing to the fact that at that time the price of silver averaged about 55 cents an ounce as against upwards of $1.30 at the time of writing.

At the Temiskaming mine a considerable quantity of ore has been developed during the current year, and further profit has been carried to surplus which at the beginning of this year amounted to some $900,000. The management, however, declares that the new ore shoots opened up are more or less patchy and their full importance cannot yet be estimated. Among not a few of the shareholders the present physical condition of the mine and the strong financial position may enable the directors to resume dividend disbursements early in 1920.

The Beaver Consolidated continues to mine substantial quantities of high grade ore at and above the 700-ft. level.

The Trethewey-Cobalt Company is meeting with success in the development of the Castle property in the Gowganda district. At the time of writing, the new shaft has reached a depth of 100 feet and a substantial shipment of high grade ore is being assembled ready for shipment. The consignment is expected to be sent out during the last half of December. At the beginning some 205 bags had been taken out, and this number was being added to at the rate of around ten bags daily. It is also learned that in the main workings at a depth of 400 feet some high grade ore has been encountered in a strong vein. The shipment will be the first from the Castle property.

The Reeves-Dobie at Gowganda is now operating its mill and producing at the rate of not for under $1,000 every twenty-four hours. As yet this company has confined its effort to surface, not going below a depth of 100 feet. As to whether or not there is sufficient tonnage in sight to continue the present rate of output for a long period has not been announced.

The general outlook in the Gowganda district is quite favorable. The three producers, namely: The Miller Lake O'Brien with an established record of over $1,000,000 annually, the Reeves-Dobie producing $1,000 daily at least for the time being, and the Castle property to join the producing list this month, lends to the Gowganda area considerable importance. In addition to the producers, there are a number of

new operations under way with fair prospects of developing into shipping mines. Such properties include the following: The Walsh property, which adjoins the O'Brien on the South, and which is controlled by Jack Walsh of Montreal; the Miller Lake Silver Bullion, formerly held by interests who are associated with the Hudson Bay Mines, but now under the option to Montreal interests; the Eastern property situated on the East arm of Gowganda Lake, and which is said to be controlled by interests who are identified with the Eastman Kodak Company; the Collins property at Leroy Lake, as well as the Silver Bullion property in that district. In addition to the shipping mines, as well as the Silver Bullion property in that district. In addition to the shipping mines, and the large number of other active properties, there are a number of important deals pending. Among these might be mentioned the Everett property which adjoins the Castle and which is being secured by interests with whom is associated Sir Henry Pellatt of Toronto.

Everything considered, there appears to be reasonable assurance that the Gowganda area may serve to replace to some extent at least the natural decline in silver production in other centers.

In the South Lorrain area there are also signs of reviving interest. This week, according to a report from Toronto, J. M. Wood and Robert Josey, original stakers of the Keeley mine, have sold their Beaver Lake property, and work is to commence at an early date.

Cobalt Shipments of Silver Ore—No Bullion Shipped

During the week ended Nov. 28th, four Cobalt companies shipped an aggregate of four cars containing approximately 323,321 pounds of ore, as shown in the following summary:—

	Cars	Pounds
Buffalo	1	110,000
McKinley-Darragh	1	84,274
O'Brien	1	61,850
Hudson Bay	1	63,197
Totals	4	323,321

During this period it is interesting to note that no bullion shipments were made. The absence of bullion shipments is remarkable for the reason that the mines are all producing at full blast and the average price of silver during the week was the highest in Cobalt's history. The incident appears to indicate an expectation on the part of the mining companies that quotations for silver will advance to still higher levels.

During the week ending 6th December, shipments of ore from Cobalt amounted to only one car from the McKinley-Darragh, the consignment amounting to 108,145 pounds. The reason for the low shipments may be attributed to winter having set in, which always has a tendency to handicap shipment of crude ore. Another is the fact that an increasing quantity is being treated locally. From this date until spring, ore shipments may not be expected to be large, although the bullion shipped during that time will be heavy.

Following the sale of 25 acres of its property, the Chambers-Ferland has commenced development work on its remaining ground on the west side of the railway, at shaft No. 4. It is proposed to crosscut through that strip of territory lying between the LaRose and the Nipissing. The formation is favorable, being made up of a thick layer of conglomerate.

A number of veteran employes of the Buffalo Company have been presented with a purse of $1,000 each as a mark of appreciation for service rendered while in the employ of the company. The Mining Corporation of Canada has now taken complete possession of the mine, following the purchase of the controlling interest a week or so ago.

As yet no decision has been rendered in connection with the legal points at issue between the opposing interests in the Bailey-Cobalt.

During the month of November the Kerr Lake mine produced 115,000 ounces of silver as compared with 112,000 ounces during October. The mine is maintaining its position of being the third largest silver producer in Canada.

The Mining Corporation of Canada in an official statement declares that it has been found advisable to not pay the regular quarterly dividend, ordinarily due this month, but expresses the belief that disbursements will continue early in the new year. The reason for this course is due to the company having purchased a 70 per cent interest in the Buffalo Mine as well as a lease on the Foster property. The official statement issued also deals with the fact that the company lost two and a half months' production owing to the last summer's labor strike. The indications are that the company will produce slightly under one and a quarter million ounces of silver during 1919.

The offer made by the Northern Customs Concentrator Company for the La Rose mine was not accepted, it is learned officially. The La Rose Company is understood to have not endeavored to sell its original holding, the offer being entirely voluntary on the part of the Northern Customs Company.

THE GOLD MINING CAMPS

Rapid improvement is taking place in the gold mining camps of Northern Ontario. On every hand a greater degree of activity is made manifest. While not a few industrial plants in other parts of this continent are curtailing operation due to the shortage of coal caused by the great coal strike which continued throughout the whole of the month of November, the mines of this country have been able to operate at desired capacity. This favorable situation may be attributed to the rigorous climatic conditions of the North where it is necessary to provide, months ahead, the required fuel in order to avoid the unsatisfactory delivery during the winter months. Your correspondent has followed progress in the gold mining camps of the north from the commencement of development. Reviewing the entire field there exists a greater degree of confidence than ever before in the North's history.

The number of men available is slowly but steadily increasing.

The Hollinger has succeeded in accumulating a surplus of around $3,750,000 in addition to distributing a one per cent dividend $246,000 every eight weeks. The McIntyre, in addition to paying an interim dividend of 5 per cent every four months is constantly adding to its surplus. The Dome, after being closed down and

without any surplus last spring, has declared a dividend of 2½ per cent payable January 15th next. These factors are all tending to lend greater stability to the degree of confidence placed in the leading mines.

The McIntyre-Porcupine is carrying on work on a scale more extensive than ever before. By spring a depth of over one-third of a mile will have been reached. The importance of this cannot be lost sight of. Values have increased accordingly as greater depth has been reached. What holds good at the McIntyre may reasonably be found to apply in a more or less general way to all the leading mines, in that the geological conditions peculiar to each bear marked resemblance.

The Dome is treating close to 30,000 tons of ore monthly. The mill has a rated capacity of 45,000 tons a month. Costs are said to average between $3,50 and $4 a ton, while the ore treated in recent months has averaged around $8 a ton. These figures, of course, must be dealt with cautiously. First of all, $8 a ton is above the average in the entire mine. Also, $3.50 or $4 a ton for costs is abnormal for the reason that the mill is only operating at two-thirds capacity. The fact appears to be, however, that operating at full blast that costs may reasonably be reduced to about $2.75 a ton. This would compare with about $2,50 prior to the war. Although costs of material and labor are a great deal higher at present the system of handling the ore is better, with the result that a cost of $2.75 seems a fair estimate. This being so, it would appear that in treating an average grade of ore of about $5.25 a ton, a net profit of $2.50 a ton is indicated. Treating 40,000 tons with a mill with a possible capacity of 45,000 tons a month, the net profit would approximate $100,000 a month, or $1,200,000 a year, which would be equal to 30 per cent on the companies issued capital of 400,000 shares of the par value of $10 each.

In connection with the Dome Extension, nothing of an official nature seems to be available. It is learned, however, that it is proposed to commence treating a substantial tonnage of Dome Extension ore in the Dome mill, the work to start some time this month.

The first half of 1920 is expected to be marked by the resumption of production three more important properties, namely: the Porcupine Crown, Porcupine V. N. T., and the Schumacher.

At a number of the smaller properties aggressive work will be carried on, that is at such properties as the Clifton-Porcupine, Porcupine-Keora, Gold Reef, Gold Centre, etc.

In the Kirkland Lake district, everything appears to be shaping up satisfactorily, and 1920 will probably record the heaviest production so far from that camp. The Kirkland Lake Gold Mines has recently encountered some very rich ore at a depth of 700 feet and the physical condition of the property is steadily strengthening. At the Wright-Hargreaves it is learned that with the arrival of spring the big new mill will be rushed to completion. The Tough-Oakes, it is learned officially, it is proposed to resume work in March; and by early summer the mill should be brought into operation.

At Boston Creek, a number of properties continue to be worked in an aggressive way. They include: the Miller Independence, Boston-McCrea, Peerless, Kennedy-Boston, Catherine Gold Mines, etc. Among the new operations soon to commence are the Ivanhoe-Boston and the McElroy-Hughes.

From the township of Skead prospectors are bringing encouraging reports, and the result of exploration work offers reasonable assurance that that area will be quite active during the coming year.

In the Fort Matachewan district, activity is increasing. Diamond drilling is to be carried on at least three different properties. At the Otisse the management is confident of bringing the mine to a profit-yielding basis—"Just how big it will be," said an official, "we do not know, but we are confident of success."

Special Correspondence

BRITISH COLUMBIA

The Coal Trade in the West

W. G. Gaunce, of Victoria, B. C., has been appointed fuel controller for British Columbia. This step was taken following the passage by the Dominion Government of an order-in-council prohibiting the export of coal except under license.

To obtain some idea of the condition in respect of the coal supply for domestic use, Mr. Gaunce has made inquiries at the colleries and in the different centres of the Province and finds that there is no prospect of anything approaching a serious shortage. Some weeks ago there was trouble in Kamloops, B. C., because of delay in shipments from Vancouver, B. C., but this has been overcome and the situation now is satisfactory.

What British Columbia coal can be spared is being shipped to the State of Washington, where there is a ready market. When it is proved that the local requirements have been cared for Mr. Gaunce does not hesitate to recommend that the companies be permitted to export. While the contributions from this side unquestionably are doing much to alleviate the shortage in Washington as a result of the strike, the demand there cannot be adequately supplied from this side of the line. It is not surprising, therefore, to learn that some of the mines on the American side are being operated to an extent by volunteers. One recent report is to the effect that a crew of civilians, few of whom had been underground before, went into a mine and is producing upwards of 70 tons a day.

The initiation of the federal policy in regard to licenses caused some difficulty and inconvenience among operators of small tug-boats which had been accustomed to coaling at any time fuel was required. This since has been overcome by giving such craft permission to go to the bunkers to replenish their supplies without complying with the formality of securing a license.

Mr. Thomas Graham, general superintendent of the Canadian Collieries (D), Ltd., in discussing the present condition in British Columbia in regard to the coal supply, makes the plea frequently heard that the consumer would do much to assist the producer by purchasing his winter fuel in the summer, or at least by getting over the habit of waiting until the first cold snap before placing his order. Mr. Graham described the position of the collieries as follows:

"The mines of Vancouver Island have a steady bunkering business with the steamship companies through summer and winter. A large portion of their output, however, is for domestic consumption. In order that both classes of consumers shall have a

steady supply it is necessary to equalize the summer and winter output. If the householders neglect to stock coal during the summer for winter consumption it generally happens that a severe period of cold weather in the winter will create an unusual demand for coal and the mines cannot keep up with both their domestic and bunker orders. Then they are faced with the disagreeable situation of refusing coal to those shipping companies that have made it possible during the summer months to keep the mines operating and give employment to large numbers of men. This, of course, endangers future business from such a source. In order to keep miners employed steadily throughout the year it is necessary to have a steady demand all the time and this is the reason that for years the operators have been trying to induce people to buy their coal supply months in advance."

Mr. Graham stated that 1,300 men now are employed at the Cumberland mines.

In discussing progress in first aid and safety first appliances and training in connection with the coal mines of British Columbia, credit is given the Canadian Western Fuel Co. of Nanaimo as being the first concern of its kind to take up in this Province the training of its employes in first-aid and mine rescue work. It was the first company to voluntarily install mine rescue apparatus and training stations. This was done when T. R. Stockett, of Vancouver, was general manager, and Thos. Graham, now general superintendent of the Canadian Collieries (D), Ltd., was general superintendent of the company. As well, it was the first company to use seismographs in its mines, daily readings being taken to give warning of the possibility of explosions attending seismic disturbances. The Canadian Western Fuel Co. now has organized a First Aid and Mine Rescue Association with a membership of about 200. A meeting is held each Sunday morning at which a lecture is given or paper read on some branch of mine safety work followed by addresses by medical men on first aid. Following the inauguration of the work by the Western Fuel Company, the Provincial Government passed legislation requiring that mines be equipped with safety apparatus and that employes should be trained in its use. All important mines in the Provinces, therefore, now are so provided.

In giving evidence before the Alberta Provincial Coal Commission, at its closing session held recently at Edmonton, George H. Montgomery, an operator, expressed the opinion that only British born should be allowed membership in any of the labor unions of Canada. Foreigners tended to be agitators. An amendment, he also contended, should be made to the eight-hour day law permitting overtime work and longer hours, should it be desired by the miners. He gave incidents in connection with his own experience to prove that miners frequently were willing to work overtime. O. E. Whiteside, manager of the Coleman Collieries, thought that the government should be asked to adjust the transportation difficulties. With satisfactory railroad service there was no reason why Alberta should not dominate the fuel market of Manitoba. J. R. Richards, inspector of mines, referred to the losses of coal in Alberta through the partial development of the fields. Some 43,000,000 tons had been lost through interruption of work in the mines since 1906.

Since the announcement of the Dominion Government's action with reference to the export of coal, it has been authoritatively stated that the coal of the Province of Alberta is not affected and that the collieries of that Province will be delighted to fill all orders possible coming from the other side of the line. It is pointed out, in this connection, that the mines of Alberta have an annual capacity of 13,000,000 tons and only 8,000,000 tons are used. Shipments accordingly are being made to the South. An order of 1,000 tons of steam coal for the industrial plants of Great Falls from the collieries of Lethbridge is one instance of this of which public notice was given.

METAL QUOTATIONS.

Fair prices for ingot metals in Montreal as at December 8th, 1919:—

	Per lb.
Electro copper	24c
Casting copper	23½c
Lead	8¼c
Tin	59c
Zinc	10½c
Antimony	11c
Aluminum	33c

Steel Bars	$3.10
Plate	3.35

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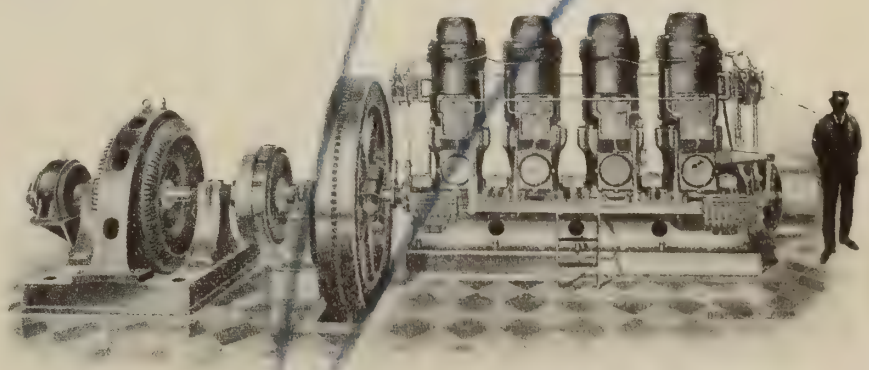

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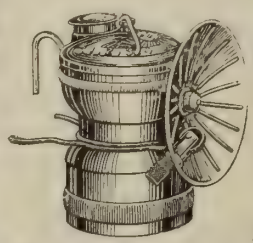

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:-: EDITORIAL :-:

Our Coal Problem

The Toronto "Globe" says editorially: "The report that Nova Scotia coal will be shipped to Ontario will scarcely bear analysis. The railway rate from the mines in Cape Breton to Toronto would be about $7.40 a ton. From Pittsburg to Toronto it is $3.50. Steam coal from the United States sells in Toronto for about $6.25 per ton, or a dollar less than the railway charges alone upon the Nova Scotia product. Even if Cape Breton coal were hauled for nothing it would cost almost as much as the United States coal laid down in Toronto."

Let us examine this statement. In the first place, there are coal mines in Nova Scotia which are much nearer to Toronto by rail than the mines of Cape Breton. The Cumberland coalfield is almost 250 miles nearer Toronto than the Cape Breton mines. There is no need to contemplate the hauling of coal by rail, except in a national emergency like the present, but supposing for argument's sake it were done, there would be one advantage in that all the money expended in wages and materials would be spent in Canada and not given to the railroads of the United States. Moreover, it may be pointed out that the cost of the rail haul from Pennsylvania to Toronto is not a purely competitive haul. It is a fortuitously cheap rate, made by the United States railroads to provide an outward freight for cars coming to Great Lakes ports to load iron-ore, which otherwise would make the journey towards Canada unloaded.

The largest tonnage of Nova Scotian coal shipped by water to Montreal in past years was slightly under two million tons, but that quantity did not by any means exhaust the possibility of water shipments from Nova Scotia. The production of coal in Nova Scotia, but for certain unfortunate tendencies, could by this time have reached ten million tons annually, and not two millions, but five millions of tons could have been available for water shipment up the St. Lawrence. Given sufficient men, sufficient ships and additional unloading capacity at St. Lawrence ports, there is no inherent difficulty in shipping five million tons of coal or more from Nova Scotia to Montreal and points further west.

The coalfield of Pictou is within a half day's rail-haul from Halifax, and there is not the slightest reason why Halifax should not become just as important a coal-loading port as Sydney, Cape Breton. Similarly, the port of Parrsboro is within 40 miles of the Springhill Mines, and this port is already equipped for loading coal cargoes to a much larger tonnage than has yet been attempted.

There seems to be a settled idea that somewhere about Brockville, Ontario, exists a western limit to the competition of Nova Scotia coal with United States coal, but this is a matter that has never been recently tested. While it is unfortunately true that the cost of coal production in Nova Scotia has greatly increased during the war, it is equally true that a great deal of this increase is due to reduced production. While the capacity of the existing coal mines in Nova Scotia for output is gravely decreased, it cannot be suggested that the limit of possible production of coal in Nova Scotia has either been reached or attempted. It certainly has not.

It may be soberly stated that the economic possibility of sending Nova Scotia coal to points west of Montreal has not even been examined, let alone tested, under the changed conditions brought about by the war.

Toronto people may rid themselves of any idea that they will ever again be able to buy United States coal —unless it be a refuse and dump product—for $6.25 per ton laid down in Toronto. The cost of coal production in the United States has undergone the same processes of increase as have taken place in Nova Scotia and in Europe, and on top of these come the new increase of at least fourteen per cent, plus the certainty of reduced hours of labor and a smaller production per man. Also, it was significantly stated by the United States Bureau of Mines recently, that the production of coal from seams three feet under in thickness, during the last mines year, was 20,000,000 tons. This is one proof amongst many that the United States coal seams have been picked over. No actual shortage of coal is to be feared in that richly endowed country for many generations, but the most accessible, the thickest and most cheaply mined seams have been very appreciably depleted. An annual coal production of between 700,000,000 and 800,000,000 tons leaves a hole in the ground.

In short, United States coal is on an altered competitive basis, and Canadian coal producers cannot be said to have yet tested that basis.

The Toronto "Globe" puts forward no argument for the use of United States coal but that of lesser cost when compared with the Canadian material. This argument would be quite a proper one were Toronto in the United States, but there are two sides to this matter. Canada could supply herself quite comfortably with at least ten million tons of bituminous coal annually in excess of the tonnage of Canadian-mined coal now used in Canada. At the low price of five dollars per ton, this tonnage would represent $50,000,000 that is now spent in the United States, that could and should be spent in Canada, which is equivalent to unnecessarily increasing our adverse trade balance by $100,000,000 per annum. This is one of the reasons why Canadian funds are at a discount of eleven per cent in New York at the time of writing.

When the increase of wages taken by the bituminous coal workers in the United States has been applied to the cost of coal to colliery fires, to the manufacturing costs of the materials that enter into the production of coal, to the cost of railway freights, and has come again full circle to the coal-miner's living costs, it will be found that fourteen per cent is but a fraction of the ultimate increase in the cost of United States coal in Toronto.

If the manufacturing interests of Central Ontario say—without further enquiry—that they cannot possibly use Nova Scotian coal, because it costs too much; and if, on the other side, the coal operators of Nova Scotia do not vigorously attempt to regain their old St. Lawrence markets, and extend them further, as the altered competitive basis suggests they could if they tried, then Nova Scotia will see its coal trade still further decline, and Toronto and its environs will become still more the economic vassal of the United States.

It is not correct to state that the extension of the market for Nova Scotia coal will not bear analysis. It will both bear and repay the closest analysis, and the day is coming when the use of Nova Scotia coal in Toronto will be an accepted commonplace.

Miner's Lamps

A correspondent of the Maritime Mining Record suggests that consideration is being given by the larger coal companies in Nova Scotia to the use of the cap type of electric miners' safety lamps, a very natural development from the great strides that have been made in recent years in the perfection of the electric lamp for the use of miners, and more particularly coal miners.

Recently the Editor had an opportunity to visit some of the collieries in Vancouver Island and was struck by the fact that the old safety-lamp had been entirely superceded by the cap type of electric lamp, except for the use of gas-testing by officials. It was a revelation in comfortable vision underground to walk behind a party of men wearing these lamps, and not to experience the discomfort of walking behind a collection of dazzling and bobbing points of light.

In the Nova Scotian collieries, since the introduction of safety lamps some fifteen years ago, there has been an appreciable increase in the number of cases of nystagmus. This affection of the eyes of miners has been assigned to various causes, but the concensus now is that it is caused by deficient illumination, or, more specifically by the effect of a concentrated pin-point of light surrounded by complete darkness. Relief has been experienced from the white-washing of large areas of the mine roads, which does not increase the illumination present, but avoids the painful contrast between a point of brilliant illumination and the surrounding darkness. Two advantages in the electric cap-lamp are the greater illumination it affords, and the fact that the light is thrown in front of the eyes of the wearer without shining directly into the eyes. A third advantage is that previously mentioned, when men are walking underground in single file, as they so often have occasion to.

From the point of safety, the electric lamp is distinctly superior to the ordinary oil lamp. The writer was told by the superintendent of one of the Western collieries that the number of accidents among men engaged on the haulages has materially decreased since the electric cap-lamp was introduced, as its use permitted the wearer to have his hands free, and he was not distracted from his work by necessity to handle his safety lamp with great care for fear or losing his light. With the cap type of safety lamp, there is no necessity to hang the lamp on a prop or other handy support, or to place it on the ground, both of which practices lead to broken glasses and other damage to oil safety lamps, with consequent danger from exposure of the naked flame to the atmosphere of the mine.

The electric lamp also requires no oxygen for flame combustion, and gives off no combustion products to the mine air. This is an important matter, and will be specially important in submarine mining when the faces reach out to sea to a distance requiring auxiliary forms of ventilation current and supply.

One colliery in Nova Scotia is already supplied with the electric cap-lamp, with very satisfactory results. It will not be surprising to hear of the adoption of electric safety lamps in all new collieries, and the

gradual replacement of the oil lamp by electric lamps in the older collieries.

The question of gas detection should impose no obstacle to the introduction of the electric lamp in a properly organized colliery, and in most cases it will be a distinct advantage to have it clearly understood that the official who is charged with the duty of making observations for the detection of inflammable gas is the only person on whom this responsibility is imposed. The presence of monoxide cannot be detected by an oil light. The presence of carbon dioxide should not be looked for in any modern and well ventilated mine, but all the requirements of gas detection in the mine air can be fulfilled by the use of a limited number of oil safety lamps in the hands of properly appointed and qualified officials.

Scotia Acquires Control of Acadia Coal Company

The official announcement that the Nova Scotia Steel & Coal Company has acquired the controlling interest of the Acadia Coal Company, and will now enter into the management of the properties and mines of that Company, is of very great interest to the coal trade in Nova Scotia. It is an encouraging event, in a good many respects, but not the least hopeful feature which is disclosed by this extension of the Scotia interests, is the progress made towards a realization of the chief need of the coal business in Nova Scotia, namely, a consolidation of coal properties and interests. A number of years ago the writer formed the definite opinion that any stability or prosperity which had been achieved in connection with the coal mining activities of Nova Scotia was the result of a consolidation of interests, and that any future progress could only take place as an outcome of further consolidations. Later events have served to confirm this opinion.

The acquisition of the collieries of the Acadia Coal Company by Scotia will enable some notable economies to be effected by the use of electricity as a motive power, in substitution for the existing steam drives, at the Trenton works of the Scotia Company. It is not generally realized by coal-mining circles in Nova Scotia, what a well-designed, modern and efficient power-plant the Acadia Coal Company possesses at the Allan Shafts at Stellarton. A description of this plant has appeared on several occasions in the columns of this Journal. It may be taken for granted that full use will now be made of the capacity of this plant for the generation of power that can be transmitted with little cost to the Trenton Plant, which is within sight of the Allan Shafts.

The possibility of the acquirement of the Acadia properties by the Scotia Company has for some time been a live topic in the County of Pictou, as it has been presumed, and correctly presumed, that such a consolidation forecasted the permanence of the steel-working industry at Trenton. Steel manufacturing processes are always an outgrowth of the possession of coal, and popular opinion in New Glasgow has been correct in associating such a consolidation as has now taken place, with much promise for the future stability of a district that was felicitously named New Glasgow, and has endeavored with marked success to emulate its larger namesake on the banks of the Clyde.

Christmas, 1919.

The Editor takes this opportunity to wish the readers of the Canadian Mining Journal a very Happy Christmas. Taking things large and by, the members of the mining community of Canada, which paradoxically enough, is an unusually scattered and at the same time an exceptionally united one, has much to be thankful for.

The material rewards which have come to miners during 1919 have not been inconsiderable. Our men —except such of them as will not come back—are home from the war, and are, for the most part, back in harness. The year has been marked by much new discovery and testing of not fully known mineral areas. The well-grounded belief of the mining engineers of Canada in our country's latent mineral resources has been strengthened.

The Canadian miner, better than any other man, knows that we possess a good land and a vast one, because he has usually seen it first. He may be regarded as an incurable optimist, but usually he knows whereof he speaks. To its readers, in scattered camps, in a land that stretches "From Sea to Sea, and from the Great Waters to the Ends of the Earth" the "Journal" extends its heartiest and seasonable greetings.

Newfoundland's Coal Areas

By E. D. HALIBURTON, Port-au-Port, Newfoundland

For many years coal has been known to exist in Newfoundland, but until twelve months ago no serious attempt was ever made to prospect, much less to mine these coal deposits. Within the past year two companies have begun operations, though as yet they have exerted themselves rather in prospecting than in mining, and although the existence of large deposits of workable coal seems probable, enough work has not yet been done to make the probability a certainty.

The more promising of these areas is that owned by the St. George's Coal Fields Co. This is a local Company capitalized at $500,000, the shares being owned mostly by Mr. Thomas J. Freeman of St. Johns', in payment for the property. It lies about ten miles from the coast and seven miles from the Reid Newfoundland Railway, between the Robinson and Middle Barachoix Rivers, and consists of four square miles of level, thickly wooded country capable of supplying pit-props and building material for a long time. On this area sixteen seams have been located and it is reasonably certain that others exist. The four principal seams are: The Juke's, the thickness of which, measured at right angles to the roof varies from 4 ft. 8 inches to 6 feet; the Howley, 4 ft. 2 inches; the Cleary, 2 ft. 2 inches; and the Murray, 5 ft. 4 inches. The coal is of a very good quality, bituminous, and free from sulphur and there is one small seam of cannel. The associated strata consists for the most part of a greenish grey sandstone.

Computations based on the known outcrops alone.

Map showing the Carboniferous Areas of Newfoundland

Taken from "Coal Resources of the World."

place the amount of coal present at over one hundred million tons, but so far the company has not been financially capable of employing a drill to aid in corroborating these figures, though it is hoped to do this next Summer.

The Jukes seam has been partially opened up by the efforts of half-a-dozen miners who have been working there for the past year. Practically none of the other seams have been touched. The Jukes seam strikes north and south, and dips east 52 degrees. About a thousand yards from its outcrop in the river bank, it is cut transversely by a deep gulch and from the bottom of this gulch the men have tunnelled into the coal along the line of strike, 165 feet towards the north and 150 feet towards the south. Throughout this distance the dip and strike continued perfectly uniform. The floor of the seam consists of hard rock with a thin layer of fireclay between it and the coal and about six inches of debris had to be cleared away to get a solid roof cover. The men are now sinking a shaft some distance to the north in an endeavor to locate the seam again. It is so situated that a great part of it could be stripped of its cover and mined opencast for a long time; and in other cases by shaft and levels, driving heads uphill and letting down the coal to the main level, where it could be hauled in trucks to the shaft.

It is believed that these seams are the western outcrop of a large synclinal basin of coal which outcrops again about five miles to the north-east. According to maps and reports drawn up by the late Alexander Murray and James P. Howley, F.C.S., this basin is shallow, the depth from the surface to the trough of the syncline probably not exceeding one to two hundred feet, and the dip of the seams consequently being gentle. The area occurs in a great, level expanse of undisturbed country, which would imply that the coal beds ought not to be seriously faulted or disturbed.

Commercially the locality is not inconvenient. It would not cost very much to make "Crabbes," ten miles to the west a good summer port, and "La Poile," forty miles south is a splendid harbour open all the year round.

Lack of financial backing prevents the present development of these areas, but it is hoped that within a few years Newfoundlanders will realize the value of latent wealth and heat lying dormant there and invest sufficient capital in the Company to develop the coal deposits and thus supply the island with its own coal. The Government is doing its utmost to encourage the company and has granted them many valuable concessions, besides binding itself to pay a bonus of one dollar on every ton of coal produced.

Reid's Coal Fields.

The other coal deposit is at South Branch on land owned by the Reid Newfoundland Co. It is divided by a ridge of mountains, and lies about thirty miles southwest of the St. George's Coal Fields, being also about ten miles from the coast.

This deposit is so far known to consist only of a single seam from twelve to twenty-two feet wide, which dips vertically. It is situated in more or less disturbed country. A mountain of igneous rock rises near the mine and leads to the belief that a batholith once forced up these coal measures to be eroded later during the glacial period. The facts can only be disclosed by actual development work.

Last winter about one hundred men were employed by the company, and about three thousand tons of coal was mined by the overhead method, a slope being drifted into the hill along the strike. This coal was hauled to the railroad about four miles away, by teams. At present twenty men are employed and they are sinking a prospecting shaft which is 120 feet deep, at which depth the coal has become much harder, while the width and dip remain the same.

Mining activities of the Reid Newfoundland Company, now come under a newly formed department of that company, known as the Newfoundland Development Company, at the head of which is Mr. Forbes, M.E., and associated with him is Mr. Hatch, Mining Geologist, well known in the Cobalt District.

WINTER MINING COURSES FOR PRACTICAL MINERS AT THE COLLEGE OF MINES, UNIVERSITY OF WASHINGTON

The College of Mines, University of Washington, Seattle, advertises courses in Quartz Mining, Placer Mining and Coal Mining, from January 5th—March 25th, 1920. The expenses consist of a fee of ten dollars and laboratory deposits for materials actually used by the individual students. Ex-service men are exempt from the fee of ten dollars. No previous training is asked from entrants, who are merely required to be able to read and write English.

The courses offered are as follows:

Quartz Mining

Flotation and Gravity Concentration.
Ore Mining Methods.
Asssaying for Gold, Silver, Copper, Lead, Tin, Antimony and Tungsten.
Geology and Mineralogy.
Mine Surveying.
Chemistry.
Mining Law.
Forge and Foundry.
Mine Timber Framing.

Placer Mining

Testing Placer Ground.
Hydraulics.
Dredging for Gold.
Melting and Refining.
Surveying.

Coal Mining

Analysis of Coals.
Surveying.
Lamp Testing.
Mine Rescue and First Aid Training.
Coal Washing Methods.

The College of Mines is to be congratulated on its enterprise. There is no greater educational need today than to bring the faculties of our large universities into actual contact with the worker at his work. Happy is that mining district which is situated sufficiently near to a university to permit of the extension of its teaching activities to men actually engaged in mining.

The university extension idea is a good one, and we do not think it is possible to overdo the extra-mural work of the modern university.

COUNTRY ROCKS OF ELLIOTT PITCHBLENDE DEPOSITS.

By R. E. HORE.

Some descriptions of the pitchblende deposit in Butt township, Ontario, have been published in the Mining Journal. I have recently had occasion to examine more closely some of the rocks collected when I visited the deposit, and am submitting a few notes for publication, as they may be of some use to others.

The pitchblende bearing feldspar-mica-quartz dyke where exposed at Elliotts' discovery lies against a medium grained gray rock. It is made up largely of nearly colorless grains of feldspar and quartz; but has regularly distributed through it a very large number of crystals of dark minerals—biotite and hornblende. The mica is more conspicuous and more easily identified than the hornblende, but the latter is quite abundant.

Microscopic examination shows the hornblende to be of a rather unusual variety. It is blue in color, while the common hornblende is green in thin sections. Most of the mica crystals show the brown pleochroic colors of biotite, but there is also present some pale green muscovite. The rock is for the most part unaltered, but there are some small areas of secondary minerals—chiefly carbonates.

The hanging wall rock is not exposed at the Elliott deposit. An outcrop at the outlet of the lake has an unusual appearance, the rock having a decidedly brownish color, even when freshly broken. It is a finely granular rock and the mineral constituents are scarcely determinable without a microscope. The cause of the brownish color of the light colored minerals is at once evident under the microscope. The feldspar and quartz are in very small crystals and scattered through the aggregates of feldspar and quartz are very numerous minute grains of a mineral resembling hypersthene. It is pleochroic, being of pale gray color in some positions and pale pink in others, varying in color according to the direction of light vibration. It would doubtless appear as a dark brown mineral by reflected light when examined in the ordinary way by the naked eye. The most prominent constituent of the rock is hypersthene, of which there are abundant crystals similar in character to the small grains which occur in the feldspar aggregates. There is also present some strongly pleochroic brown hornblende.

The area in which the Butt pitchblende deposit occurs forms part of the great Pre-Cambrian crystalline formations generally described as granite gneisses. The rocks examined are, however, not the common types, and their unusual character may be of some help in exploration.

METAL QUOTATIONS.

Fair prices for ingot metals at Montreal, 17th December 1919.

	Per lb.
Electro copper	24½
Castings Copper	24
Lead	8½
Tin	60
Zinc	10⅜
Antimony	11
Aluminum	33
Steel Bars (nominal)	$3.10
Plate (nominal)	$3.35

CANADIAN MINING INSTITUTE.

This Dominion possesses no organization of greater practical importance or of greater potential usefulness than the Canadian Mining Institute which held its annual convention in Vancouver recently.

In the nature of the case, there must be a good deal that is technical in the discussions, but there are also many questions coming up which are of deep interest to the public at large. A cordial invitation is extended to all who may wish to be present, and it is hoped that many will take advantage of it. They will have a chance of learning a good many things that may prove profitable as well as enlightening.

Among the matters the Institute will have under consideration is the advisability of "going into politics." By this they do not mean the advisability of trying to elect anybody in particular to parliament or legislature. What they suggest is the exercise of a non-partisan influence for the development of the mining industry. The idea that they could do valuable service in this way, sounds reasonable.

From time to time there has been talk of forming a Western Institute, owing to the difficulty of holding meetings at points so far apart as here and Montreal. Hitherto, however, the benefits of a common organization for the whole country have been felt to outweigh any incidental inconveniences, and it is believed that this view will continue to prevail.—Vancouver "Sun."

INSTITUTE MEMBERS AT BRITANNIA BEACH.

On Saturday the members of the Canadian Mining Institute to the number of about thirty, including students from the mining department of the University of British Columbia, and several S. C. R. men, visited Britannia Beach, where they were shown over the mill, hydro-electric and compressor plants by Mr. Browning, general superintendent, asissted by Mr. Peterson, superintendent of transportation, Mr. Lee, mining engineer, and Mr. Hughes, mill superintendent.

The method of operation was fully explained by Mr. Browning, and Associate Professor Gillies took the students through the details of the operation. After an inspection of the mill, plants and townsite the party met at the company's offices, where they tendered a vote of thanks to Mr. Donohue, assistant manager, and the officials who had entertained them.

High appreciation was expressed of the enterprise shown in the development of the Britania mine and its equipment, and of the patriotic work done at Britannia Beach during the war. Dean Brock and Mr. H. Mortimer Lamb, secretary of the Canadian Mining Institute, were appointed a committee to draft a letter of thanks to the company for the information afforded the visitors by the inspection of the plant; conveying to Mr. Moodie, the general manager, their admiration of the remarkable enterprise which they had seen, and the efficient manner in which it had been carried out; also conveying to Mr. Moodie, the sympathy of the Institute in the family bereavement which prevented him from being present on the occasion.

Three cheers and a tiger were given for the company and its officials. The visitors were then entertained to dinner by the company and left at 6 p.m. on the return trip to Vancouver well satisfied with the day's outing. —Vancouver "World."

Further Notes Regarding the Vancouver Meeting of the Canadian Mining Institute

A party of C. M. I. members took advantage of the trip to the Cassidy Mines of the Granby Consolidated Smelting Company which the local committee had arranged, and escorted by Mr. Thomas Graham, general superintendent of mines of the Canadian Collieries (Dunsmuir) Limited, visited the Cassidy Mine on Sunday, the 30th November, where they were met by Mr. E. G. Wilson, the superintendent of the Granby Company at Cassidy's.

The party included Capt. W. A. Richardson of Courtney Bay, Mr. G. H. Kilburn of Trail, Mr. Dudley Michell of Edmonton, Mr. W. R. Wilson of the Crow's Nest Pass Coal Company, Mr. Brewer, resident engineer of the Mines Department, Mr. F. W. Gray, editor of the C. M. Journal, and Messrs. McPhee, Gilchrist, Hailyard, McKechnie and Dixon, students from the University of British Columbia.

The party first visited the No. 1 Colliery of the Western Fuel Co. on Nanaimo Bay, the oldest and the most consistently successful coal mine on the Island, where they were shown round the surface by Mr. Stirling, the general manager. The workings of this colliery are entirely submarine, and a unique feature is the man-shaft on Protection Island. Coal is being mined both from the Newcastle and the Douglas Seams.

From No. One, Nanaimo, the party motored to Cassidy's, where they inspected the unique plant recently completed there by the Granby Company, and previously described in the Journal. Unfortunately, the boiler inspector was at work, and the steam being off, it was not possible to inspect the workings of the mine. The lunch given to the visitors was most excellent, and the brand of pie manufactured at Cassidy's was voted to be as fine as the plant, and that is "going some." The situation of Cassidy's is beautiful by nature, and unspoilt by art. Superb timber occurs all around, and the plant is situated in a natural amphitheatre or alluvial flat, flanked by a heavily wooded hill which goes up rapidly for 300 feet. In a gorge below runs the Nanaimo River, a stream of deep green clearness, with steep banks covered with fine trees, hart's tongue ferns, and luxuriant bracken. The writer, after listening to Mr. Wilson's description of the colliery and its buildings, remarked that it sounded like the description in the Apocalypse of the City Beautiful close by the river of crystal, but actual inspection of the site proved a pleasant surprise, even after the written description had given some idea of what to expect.

On the return journey, the party were taken by Mr. Graham, who acted as the guardian and mentor of the visitors, to No. 5 Colliery of the Canadian Collieries, where the workings were visited. The nature of the coal occurrence is distinctly different from any of the eastern occurrences, and one would imagine that a thorough knowledge of local geology and some acquaintance with the earth movements was a first essential to successful coal mining in Vancouver Island. The visit was in the nature of new knowledge to most of the party, and was thoroughly enjoyed—even if it did snow on the way home.

To eastern eyes, a feature of the Vancouver Island collieries is the use of electric head-lamps, of the Edison type, in preference to the oil safety lamp. The advantages of this type of lamp cannot be denied. The use of Marcus screens and devices to lessen coal breakage seems general, and a particularly handy arrangement was the use of a small motor for raising and lowering the apron that drops the coal into the railway cars. Two items of equipment that interested the writer were a gravity-operated, three-car tipple at the No. 1 Nanaimo Colliery, and a coal-washer of the Robinson type, similar to one that used to do fairly good work for the Dominion Coal Company before it was destroyed by fire.

Another thing that struck one coming from a country where timber is small in size and costly in price, was the lavish use of excellent timber in the Vancouver Island collieries. Also one was struck by the evidence of a climate so mild as to permit washeries and other places where water was used to operate in the open air without enclosure or danger of freezing. No protection from the weather seemed to be necessary, except protection from rain. It was not possible for the party to visit the mines further up-country, but sufficient was seen by the party, thanks to the assiduous courtesy of Mr. Graham, Mr. Wilson, and other mining gentlemen in the Island, to make the journey very pleasant and informative.

One was interested in the evidence of the anticline that shows in the rocks near the old Hudson Bay Bastion near the waterfront of Nanaimo Harbor. The bastion itself is a fine relic of former days, which it should be the pride of the citizens of Nanaimo to preserve, and it was therefore extremely surprising to read in a Vancouver paper that the bastion was likely to be sold for taxes, and destroyed if these continued in default. One can with difficulty believe that such a proposal would be seriously made.—F.W.G.

No. 1 Shaft of the Western Fuel Co., Nanaimo, Vancouver Island, B.C.

A FLOOD OF TECHNICAL PAPERS.

At the technical meetinge held at Chicago in the last week of September, probably a record was made in the number of papers presented on iron and steel subjects alone, saying nothing of those in other lines. At the sessions of the American Institute of Mining and Metallurgical Engineers at least 24 papers on iron and steel were presented, besides a half dozen on steel and allied subjects before the American Electrochemical Society and the Exposition of Chemical Industries, a session on pyrometry alone, lasting a whole day, had an array of 53 papers, of which 35 were presented by the authors or their representatives. Thity-nine papers, of which 14 were read by title only, were offered at the technical sessions of the first convention and exhibition of the American Steel Treaters' Society.

In all, at least 120 papers on iron and steel and allied topics were scheduled for the three Chicago conventions. A week later at Philadelphia American foundrymen were offered a total of 42 papers, spread over four days of sessions on iron and steel foundry problems. This summary does not include 19 papers on the program of the American Institute of Metals for sessions in conjunction with these Chicago and Philadelphia meetings.

While many papers in these long lists were of a high order of merit, the question arises whether the effort to produce a large volume of literature for every such meeting has not been overdone. From those who attend the remark is often heard that there is too much to absorb. It can hardly be contended that any subject is so important that 53 papers should be scheduled for consideration at a single meeting.

The matter is serious enough to suggest to the managers of these various societies whether programs should not be curtailed, perhaps decidedly. It is generally conceded that two important benefits should be the result of such meetings—a discussion of papers and an interchange of views and the making of new acquaintances. In many cases at Chicago, where sessions were held morning, afternoon and evening, though not so much at Philadelphia, programs had to be rushed through, affording inadequate time for fruitful discussion. The papers can be read by the members at their leisure in most cases, many of them before the sessions, but the real benefit is the exchange of views on the floor of the convention. In most cases discussions of prominent papers should have several leaders pre-arranged for. Too often an excessive amount of time is consumed in presenting the papers. There is danger that this really vital part of the work of our leading technical societies may be made ineffective through straining after volume, unless some reform is instituted.—"Iron Age."

Note:—This editorial from the "Iron Age" of 27th November, is interesting corroboration, from a United States source, of the similar views expressed in the "Journal" of the issue of 26th November.—Ed.

PERSONAL.

James P. Flynn, M.E., has changed his headquarters. his office now being on the fifth floor of the C. P. R. Building, Toronto.

TORONTO NOTES

Proposed legislation to define status of the Engineer. Mr. Tyrrell goes to England...Notes from the Ontario Capital.

(Staff Correspondence.)

On November 28th the Toronto members of the Institution of Mining and Metallurgy of Great Britain dined together at the National Club and continued an informal meeting after dinner. It was decided, on the consent of the parent Institution being obtained to form an Eastern Canadian or Ontario branch to discuss matters connected with the general welfare of the profession of mining engineering in Canada. Mr. J. B. Tyrrell, who is just leaving for England was asked to submit the matter to the Council of the Institution in England. Those present at the meeting were Dr. Miller, Provincial Geologist and Messrs Tyrrell, Guess, Haultain and Segsworth. A number of other points conected with the welfare of the organization were also discussed before the meeting adjourned.

When Mr. Tyrrell returns to Canada in February he will go out to the Gabrielle property in Eastern Manitoba, Rice Lake District, the Gabrielle Mining Company having asked him to direct the development of the property. Gabrielle was the first property located in the Rice Lake District. They have two very good looking veins and there has been some work done on the property of which no records have been kept. A number of assays have been taken, all of which show good values. As the veins appear to be worth systematic development Mr. Tyrrell has accepted the position of consulting engineer and will also direct the development work when it is started.

It is stated that the Mining Corporation of Canada are surveying and erecting buildings on their pitchblende property in the township of Butt preparatory to active exploration. The Elliot Syndicate of Chicago, the discoverers of this ore of radium, are also going ahead vigorously and assays obtained by them are said to show 600 milligrams of radium per ton of pitchblende, together with 70 per cent uranium oxide. This oxide is now worth $3 per pound. It is not, however, know how much pitchblende can be obtained from each ton of rock. The mineral is in small particles scattered through the pegmatite. Owing to the weight of pitchblende, which is about four times greater than the rock in which it is found, concentration is comparatively easy. It is pointed out, however, that the values given are for the pitchblende when removed by concentration. It will probably require many hundreds of tons of pegmatite to give one ton of pitchblende.

A meeting of the Toronto branch of the Canadian Mining Institute was held on Saturday, December 6th when the following executive committee was elected: C. E. C. Smith, chairman; J. H. Black, D. A. Dunlap, H. E. T. Haultain, R. E. Hore, H. L. Kerr, James McEvoy, W. G. Miller, W. E. Segsworth, J. B. Tyrrell, A. J. Young. The meeting, which was a representative one, unanimously decided to nominate O. E. S. Whiteside for president for the term commencing after the next annual meeting. There was considerable discussion on the proposed legislation to define the status of the Engineer and it was resolved that the chairman should appoint a committee to draft a bill applicable to Mining Engineers.

ANOTHER SOURCE OF SULPHUR.

For some time there have been occasional suggestions, more or less practical, for the utilization of the vast amount of sulphur dioxide which is annually wasted in connection with the use of the sulphide ores of Ontario. A method of utilization of this gas which gives every promise of success is reported to be in operation in connection with the Tacoma Smelter in Washington. The sulphur dixoide is liquified and since in this condition it is quite readily separated from air and other gases it can be placed in suitable containers and shipped to sulphite mills within reasonable distance.

The only places so far considered as a source of sulphur dioxide gas from Canadian mills that until last week had come to our attention were the operations in the Sudbury district of Ontario. The mills which are likely to find it most convenient to use liquid sulphur dioxide are those of the Spanish River Pulp and Paper Mills, Limited, although it is possible that other Canadian plants may find it possible to do so. Within a fairly short and direct shipping distance of Sudbury we find the three mills of the Spanish River Company, the three sulphite mills in the Niagara district, the new Kipawa Fibre Company at Temiskaming and possibly even the Abitibi and Mattagami Mills near Cochrane.

It was our pleasure a short time ago to hear a paper read at a meeting of the Montreal section of the Society of Chemical Industry on the "Zinc and Lead Deposits of Gaspesia." It appears that there is a particularly rich deposit of blende and galena in a vein which has outcrops almost in the centre of the Gaspe Peninsula. If these ores are transported to some point on the Baie des Chaleurs to the south to be smelted there would be available for cheap transport a considerable amount of sulphur dioxide gas. From an operation handling 100 tons of lead per day we should have available about ten tons of sulphur dioxide or the equivalent of about five tons of sulphur. If this were depended on as the entire sulphur supply for a pulp mill it can be seen that at ordinary rates of consumption such an amount would satisfy a mill making only about 20 tons of pulp, but if used simply for strengthening the acid in a sulphite plant it is impossible to predict how large a plant could be served because of lack of information on the amount of strengthening that would be possible or necessary.

These points are mentioned because in the discussion of the paper it was suggested that the sulphite industry would furnish a market for a by-product of the mines in the manner indicated. No doubt the development of these deposits will in time make larger amounts of sulphur available in the form of liquid sulphur dioxide, and if the smelters are located on tide water there are a number of mills which can very easily be reached by transporting the gas in tanks loaded on scows. In the immediate vicinity there is the mill a Chadler and it would not be a very serious matter to tow the scows to Bathurst and Chatham and they might even be moved up the Saguenay to Ha! Ha! Bay and Chicoutimi. If tank cars were used it would then be possible to reach the Nashwaak mill at St. John, N. B., the Fraser mill at Edmundston and many others in Eastern Canada. It is likely to be some time before such an extensive market will be served, but it is interesting to consider possibilities.—From "Pulp and Paper."

PRODUCTION OF HELIUM IN CANADA.

Eugene Coste, President of the Canadian Western Natural Gas Light and Heat and Power Company of Calgary, who was in Toronto this week, declares that Helium, which will shortly be produced in commercial quantities in Canada, may now be safely added to the Dominion's long list of natural riches as an established fact. Its value as a non-inflammable substitute for the hydrogen gas now used in dirigible balloons, thus practically rendering the danger to airships from fire negligible, is still further enhanced by its scarcity. Canada and the United States being the only countries in which it is found so far, Canada having the advantage in the matter of ease of extraction from the other gases and thus, also, of cheapness of production. Following the discovery made some years ago that helium was a constituent of certain natural gases found in Canada and that it itself was an inert non-inflammable gas, lighter than air, said Mr. Coste, it was brought to the notice of the British Admiralty by Professor J. C. McLennan who was on the Research Board of that body during the war. If at once became the subject of detailed investigation and experiment by the British authorities who, working in conjunction with Mr. Coste's company, erected experimental plants at Calgary. The United States Government, immediately after the entrance of that country into the war, begun similar work near Fort Worth, Texas, where three plants, costing $1,098,000, were erected for the purpose of discovering the possibilities of the gas both as to the uses to which it could be put and the quantities in which it could be produced. Both Governments were convinced that it was an exceedingly valuable commodity for war purposes, as balloons changed with it had nothing to fear from incendiary bullets and projectiles, which were the menace of British airmen in lighter-than-air craft, and which were also the means of bringing many a German Zeppelin to the ground.

Experiments having proved that it could be produced in sufficient quantities, plans were under way to utilize it in the theatre of war and had proceeded so far that when the armistice was signed 200,000 feet enclosed in high-pressure cylinders were on the docks at New Orleans awaiting shipment to the war zone.

Experiments are now being conducted at the University of Toronto to discover if there are other uses to which helium can be put than solely as a buoyancy producer for lighter-than-air craft. Once the commodity is being produced in commercial quantities which Mr. Coste says will shortly be the case, aviation companies which are now in process of organization will be able to assure their patrons of perfect freedom from the danger of fire.

The triumph of the U. F. O. party in the Ontario elections is an expression of class consciousness. If the U. F. O. seeks to use its powers to benefit only the farmers it will fail, as all power founded on selfishness and class assertion will ultimately fail. History and Christian philosophy are very specific on this point.

The Ontario elections reflected more than anything else a revolt of the country mice against the town mice. All the same the history of the country visitor in town, according to the fable, has its warning lesson

The Latent Iron-Ore Resources in Canada Lying North of Lake Superior

By J. J. O'CONNOR.

A country that is developing with the rapidity that Canada is to-day, and that is five years in arrears with all kinds of constructive development, into which iron enters so largely, and is dependant on imported ore for 95 per cent of its furnace supplies, is in an economic condition that should not be allowed to obtain any longer, particularly if we consider the vast deposits of low grade, beneficiable ores lying undeveloped in Northern Ontario.

It has been demonstrated on a commercial scale—but only after long and very costly experimentation—that low grade Canadian ores can be converted into the highest grade of ore, by various treatments, which may be collectively referred to, as beneficiation. Of beneficiable ores there are immense quantities. The prospected parts of Canada, more especially northern Ontario, are known to contain many millions of tons of these ores at points accessible by rail. Estimates, based upon diamond drilling, place the quantities of ore in certain northern Ontario deposits at figures ranging from 100,000,000 tons downward. In other provinces there are similar, though less definitely measured, possibilities.

In the district of Thunder Bay alone, an extensive range of iron bearing formation runs from Steep Rock Lake to Kaministiqua,, a distance of one hundred miles, and another belt from the east shore of Lake Nepigon, to Long Lake, a distance of sixty miles. Further outcrops of similar ore are found on Hunters Island, Little Pine Lake, north of Dog Lake, and Kawashkagama north east of Lake Nepigon. A rough estimate made by the United States Geological Survey of these ranges computes that they contain some 9,000,000,000 tons which would run 35 per cent iron content or better.

The ores are largely banded jaspilites, with intimate mixtures of specular ore or magnetite, with jasper, and depend upon some form of concentration to make them marchantable. It is also reasonable to assume that when extensive exploration by diamond drilling is inaugurated throughout these ranges, bodies of higher grade concentration will be found. Diamond drilling, at present under way, on the range east of Nepigon, has already disclosed large bodies of high grade ore, where nothing but lean jaspilites showed on the surface.

In this connection it may be pointed out that only about 50,000 feet of diamond drilling has been performed on the range of Thunder Bay district, as against some 7,200,000 feet on the United States ranges tributary to Lake Superior, up to 1911.

On Steep Rock Lake, the most westerly extension of the main iron belt, quantities of high-grade hematite-float, led to the discovery of a body of some 70 feet in width, of soft ore, by drilling. It is almost assured that the main body of the Lake is underlaid by this same body of ore.

On the Atikokan range, west of Sabawe Lake, some 15,000,000 tons of magnetite has been proved by drilling operations averaging 55 per cent iron, 13 per cent sulphur, .03 per cent phos. These are high sulphur ores, which, when roasted, make a most desirable product.

East of Sabawe Lake, the Atikokan Mine, the only developed mine in the district, shows some 10,000,000 tons, averaging 55 per cent iron, 2 per cent sulphur, and .10 per cent phos. The output up to date is 86,433 tons averaging 59.85 per cent iron, 2 per cent sulphur and .11 per cent phos.

In the neighborhood of Kaministiqua station, and in the township of Conmee, a large tonnage of lean ore is exposed averaging 35 percent or better. Tests made by the Dominion Testing Laboratories, Ottawa. show that by coarse crushing and jigging, a product running 50 per cent in iron can be obtained with a 2 to 1 concentration.

On the east shore of Lake Nepigon, on the Leitch and Ralph properties, there are numerous bodies of ore running around 45 per cent iron, drilling operations are now being carried on on the Leitch lands with highly satisfactory results.

Further east, on the same range, at Little Long Lake, over an extensive area of iron outcrops, one body 30 feet in width averages 42,67 per cent iron, .05 per cent phos, and another 400 feet wide 42.35 per cent iron, still another 20 feet that averages 49.78 per cent.

The Loon Lake iron field is of a different geological age and character. It is situated 23 miles east of Port Arthur, and is an undoubted eastern extension of the Mesaba range in Minnesota. The beds are flat lying, consisting of interbanded layers of high grade hematite, and lean taconite, and having a total thickness of about 20 feet. The ore is easily separated by hand sorting, yielding from 1¾ to 2 tons of merchantable ore, for every 3 tons of material handled.

By diamond drilling and pitting, the following tonnage has been proved.

	Tons.
McConnell—sorted ore 55 per cent iron..	1,650,000
McConnell—sorted ore 50 per cent iron..	2,430,000
Herstrom—natural ore 48.85 per cent iron..	200,000
Marks-Wiley—natural ore.....	1,168,000
	5,448,000

The ore is particularly low in phosphorous, averaging from .008 per cent to .03 per cent, and would consequently be in good demand. Less than one-third of this field has been drilled, conservative estimates place the tonnage of this field at 25,000,000 tons

The District of Algoma has very large ore supplies. In the Michipicoten district, 111,000,000 tons of siderik ores have been proven by diamond drilling and many known large deposits are as yet untouched.

The District of Sudbury is rich in this basic metal. At Moose Mountain, 100,000,000 tons of magnetite ores have been proven by diamond drilling, and estimates of the possible quantity go far beyond this figure.

With these great deposits, which may only become assets by development, it would seem that it should be the first duty of government to offer such assist-

ance in their exploitation, as would make Canada independent of foreign ores, and not almost wholly rependent, as she is to-day.

Of the 2,242,337 tons of ore charged to Canadian blast furnaces in 1918, 2,145,593 tons. The percentage of imported ore has been steadily in the increase for some years. In addition to the ore imported, Canada imported $153,000,000, worth of iron and steel products, and 67,396 tons of pig iron, in 1918.

These are startling figures, and should awaken some action on the part of the government.

With the exception of the Michipicoten district, every one of the above ranges is traversed by the Canadian National Railway, a further, and most important reason why the whole people should take an active interest in the development of our iron ore, as it would furnish much needed traffic for the railway. In the United States the mining industry contributes 60 per cent of rail traffic. In Canada less than 40 per cent originates thus.

"LAMINATED COAL"

At the statutory meeting of Laminated Coal, Limited, recently held in London, England, the following statements were made by the chairman, Mr. H. F. Smalman-Smith:

"It is scarcely three months since this company was entitled to commence business, and it must therefore be conceded that there has not been time for phenomenal development. The company was formed to acquire certain patent rights, licenses, and other assets in connection with a process known as the "laminating" of small coal. This process must not be in any way confounded with "briquetting." It consists, in part, in "stratifying," or placing the treated material in layers one above another, which by this means, coupled with that of synthetic action during combustion, becomes physically and scientifically reconstructed into a new lump of coal.

In addition to the treatment of small waste coal, this company has extended its operations to the treatment of peat, lignite, oil shale and other substances of a like nature. The result is that nearly all waste products from these materials, as well as the materials themselves, are capable of being converted into fuel of high calorific value, suitable for household and industrial purposes. The cost of manufacture will allow of its distribution at a price considerably below that of ordinary large coal."

The chairman stated that licenses had already been issued to important plants in Britain to erect plants, and that shortly a demonstration plant would be completed at which colliery owners could see their own materials reconstructed by the new process. The process, the speaker anticipated, would become one of world-wide industrial importance.

We would comment that there appears to be for once something new under the sun, and it will be, to say the least, interesting if this new process can improve on the age-long processes of nature, which, we believe, were effected by earth movements and temperatures of a power and range that finite man can only faintly comprehend.

More exact particulars of the announced process are awaited.

OBITUARY.

Stephen Pearson Brown, formerly chief engineer of the Mount Royal Tunnel and Terminal Co., Ltd., Montreal, was drowned last Sunday in Sebec Lake, Maine. Mr. Brown was pulling his nine-year-old son on a sled when the ice broke under him and he sank before the boy could summon help. Mr. Brown was about forty years of age. He was a graduate of the Massachusetts Institute of Technology, and before going to Montreal had been associated with the contruction of the Pennsylvania Tunnel in New York City. He went to Montreal in 1912 in charge of the Mount-Royal Tunnel project and superintended the design and construction until the work slackened in 1916, when he returned to the United States, as vice-president and manager of Ford, Bacon & Davies, a well-known firm of engineering contractors of New York City. Mr. Brown continued to act in a consulting capacity in regard to the Montreal terminal work for the C. N. R., and was expected in that city this month on business in connection with the C. N .R. enterprise. From 1915 to 1917 he was a member of the council of the Canadian Society of Civil Engineers. Mr. Brown was also a member of the Institution of Civil Engineers of Great Britain, the American Society of Civil Engineers and numerous other engineering, railway and scientific societies.—From "Canadian Engineer."

Members of the Canadian Mining Institute will remember Mr. Brown's courtesy at a meeting of the Insitute in Montreal, when a party of members were taken to inspect the partly completed Mount Royal Tunnel, and when later Mr. Brown gave an illustrated description of the engineering problems connected with the driving of this tunnel.

Mr. Brown's death, under such tragic circumstances, and at an early age, will be deeply regretted.

THE LATE ANGUS McDONALD,
Locator of the Gold Pan Mine, N. Man. (Mr. McDonald was killed accidentally a few hours after this photograph was taken).

Our Northern Ontario Letter

THE SILVER MINES

With the price of silver varying between $1.30 to $1.35 an ounce, and receiving payment in New York, the silver producing mines of Cobalt are now netting upwards of $1.40 an ounce for their product. This is due to American money being at such a high premium in Canada. With costs averaging about 55 cents for each ounce produced, the net profit is running high.

During the month of November the Nipissing mine produced an average of $11,674 every twenty-four hours. The month's production totalled $350,209. This compares with a total of $375,247 during the preceding month, at which time the daily average amounted to $12,105. With a surplus amounting to some $4,300,000, and with ore reserves some two years or more ahead of current production, the Nipissing appears to be in a position to reap enormous benefit from the current high quotations for silver.

In an interview with Frank L. Culver, president of the Beaver Consolidated, your correspondent learned that the Beaver is now realizing a net profit of from $2,000 to $3,000 daily. Mr. Culver stated that some of the ore being encountered at a depth of 700 feet is as rich as any previously taken out of the mine. The writer was shown pieces of almost pure silver, quite flat and almost as large as a man's hand. Perhaps the most significant statement made by Mr. Culver was that it is his intention to begin at the surface and work the Beaver Mine all over again. Recent developments, he said, have tended to show that a large tonnage of ore running from 150 to 200 ounces of silver to the ton has been missed during the course of earlier operations.

The Mining Corporation of Canada is stated to have completed the erection of camp buildings on its recently acquired property in the township of Butt, where it proposes to explore for radium.

A deal is being negotiated this week for the tailings pile located on the Chambers-Ferland Mine. This deal was mentioned a week or so ago in these columns as pending. It is now understood to be practically closed, the purchase being something like $55,000. These tailings were deposited on the Chambers-Ferland by other mines, and constitutes a Christmas box, so to speak, for the latter company.

Diamond drilling operations have commenced on the Adanac property, D. D. Chisholm of Timmins having taken the contract for driving the first hole from a cross-cut at the 310-ft. level. It is recognized that the hole is being driven more or less against what is generally looked upon as sound geological advice.

The consolidation of the Hargraves and the Reliance properties has been completed. The new company, known as the Hargraves Consolidated, has a capitalization of 2,500,000 shares. Of this, 1,000,000 is going to the former Hargraves stockholders, 800,000 shares going to Reliance owners, and leaving 700,000 shares in the treasury. The latter will be used to finance the operation and work is now being planned. The Lumsden Mine, recently acquired by C. L. Campbell of Montreal, has been de-watered to a depth of 30 feet and Major Rattray is now making an examination, preparatory to outlining a development program.

At a depth of 150 feet on the Crown Reserve an ore shoot has been opened up which compares favorably with the rich veins formerly worked in that mine. According to official advice, upwards of 10,000 ounces of silver was taken out in one round of shots. The pay-streak in the vein has a width of four inches, sometimes widening out to six and seven inches. It is officially stated that the position of the vein offers reason for believing that it may develop into an ore shoot of considerable importance. Should present values continue, a shoot of enormous value would occur in a remarkably small area.

While new discoveries are being made, and interest increasing in a general way in Cobalt, all of which tends to indicate the possibility of increased silver output from the Cobalt mines, the Gowganda silver area is gradually developing into a field of considerable merit. At the leading operations, the scope of work is being enlarged, while among the prospective properties a good deal of activity is apparent, and numerous deals, large and small, are being closed. Among these might be mentioned the Everett property, which adjoins the Castle on the West. This property is being taken over by interests with whom is associated Sir Henry Pellatt. The McAlpine property, in Haultain township, changed hands, the purchaser being John Oliver of Toronto. The Cartwright property at Bloom Lake has also been sold. These and numerous other deals have been made, the details for the greater part being lacking.

Nor is the activity in the silver area confined to Cobalt and Gowganda. It is now becoming apparent in the Maple Mountain district of the Elk Lake mining division, as well as in the township of Corkhill and in various parts of the Elk Lake district proper.

This week a spectacular discovery of silver was made on the Taylor-Kennedy claims situated in the township of Willett, some two miles from the old Lucky Godfrey property. The find has caused a small rush of prospectors to that area.

The belief that quotations for silver will continue high for a number of years, with reasonable prospects of the Elk Lake-Gowganda area being opened up by means of a meter gage railway, is causing interest in that district to increase rapidly.

THE GOLD CAMPS

Gold production in Ontario during the third quarter of 1919 having exceeded any previous quarter in the history of Ontario, ample reason for the utmost optimism is afforded. Nor has the maximum been reached. The indications are that a steady increase will continue for a number of years. This, due to the strong physical condition of the mines as shown by the sum total of the ore reserves blocked out.

The Hollinger Consolidated will disburse another one per cent dividend on December 31st to shareholders of record tomorrow (December 18). This disbursement will amount to $246,000 and makes a total of seven per cent, or $1,720,000 paid during the current calendar year. In addition to this a surplus of almost equal amount has been called forward to surplus. The Hollinger has now produced a total of something like $43,000,000 in its short career, beginning with 1911. Ore blocked out is understood to about equal the total produced during the past eight years. The management is now endeavoring to add another 900 men to the force engaged. Just as soon as this number can be added, the output may be increased close to fifty per cent over the present production.

The Dome Mines continues to treat about 1,000 tons a day and could bring the operation up to full capacity of close to 1,500 tons daily provided another 150 men could be procured. The prospects of getting this additional number of men is growing brighter. On January 15th the Dome Company will disburse a dividend of 25 cents a share, which is looked upon as the beginning of regular disbursements. It is believed that by the end of the company's fiscal year (March 31st) the rate of earnings will approximate $2.50 a ton and that the mill will be treating an average of about 40,000 tons a month. This would show a net profit of $100,000—equal to 30 per cent on the issued capital of $4,000,000 and show a 10 per cent return on shares at $30 each—the par value being $10 a share.

The Porcupine-Crown Company is negotiating with the Moneta Company with the object in view of taking over control of that company's property, situated adjacent to the Hollinger Mine, on the west. Provided success attends the present negotiations, the Porcupine-Crown would then proceed with plans to resume production.

The electrically driven mining plant on the Clifton-Porcupine has been installed, and is now in operation. Development work is now proceeding at an increased rate. In a circular recently issued, the management declares that a substantial tonnage of ore of a commercial grade has been put in sight.

The Porcupine-Keora is still calling for tenders for the sinking of a 250-ft. shaft, it being planned to have the work under way early in the new year. Heretofore, the exploration of the property has consisted of diamond drilling operations, during the course of which considerable ore is stated to have been located.

The mill on the Dome Lake Mine is expected to be ready to resume operations about the last week in December. Carl Frank, formerly on the staff of the Dome Mines, is in charge of the Dome Lake.

A Canadian-American syndicate has taken an option on the property of the Ontario-Porcupine Development Company (formerly a part of the holdings of the Buick-Moreing interests). It is planned to carry out exploration work on that part of the holdings situated at the east end of Pearl Lake, and adjacent to the Plenaurum.

Diamond drilling has commenced on the North Woods property, situated adjacent to the old Foley O'Brien, just outside of the town limits of South Porcupine.

In the Kirkland Lake district, additional operations are being commenced. The Lake Shore during November treated ore from a surface dump, and production amounted only to $10,246.28. The underground workings, however, have now been de-watered to a depth of 300 feet and current production is from ore drawn from underground. By the beginning of the new year production should be back to almost normal.

The mill of the Kirkland Lake Gold Mines is treating ore at full capacity of 150 tons a day. A record of 173 tons was established for one day. All underground work contiue to be favorable. The large ore body as developed at the 600-ft. level has been found to continue to the 700-ft. level, where considerable free gold is present.

The Canadian Kirkland is now equipped with a mining plant and mining operations are being carried forward. The property is under the control of the Crown Reserve Mining Company, and is looked upon as a prospect of more than ordinary merit.

The Ontario-Kirkland is also proceeding with development work, preparatory to blocking out ore in sufficient quantity to warrant proceeding with the installation of a mill in the spring. Directors who recently visited the property have recommended the purchase of machinery and supplies so as to take advantage of the snow roads in the work of hauling the heavy parts to the property.

In the Fort Matachewan district, the leading operation, the Matachewan Gold Mines, has suspended underground work for the time being. It is understood that diamond drilling will be continued.

On the Maloof property at Sesekinika, arrangements are being made to commence exploration by diamond drilling. The work will probably begin about the end of this week. It will be recalled that some years ago a considerable amount of gold tellurides was opened up on surface in this district. The veins were comparatively narrow.

At the Miller Independence Mine, at Boston Creek, the shaft has now passed the 400-ft. level and should reach the 500- ft. level by the middle of January. A working station will be cut at that level and a crosscut driven for the purpose of cutting the downward continuation of the rich ore body developed near the surface in an incline shaft. In the meantime the power line is being completed, and by the end of January electric energy should be available. This will be followed by the addition of two more machines and progress will be much more rapid. The outlook for Boston Creek is encouraging.

A CORRECTION.

In connection with an item which appeared in the "Journal" of the 3rd December, in which Mr. H. E. Bodine was quoted concerning the "Blue Lead" in Alaska, we are informed by the Director of the U. S Geological Survey that Mr. Bodine has at no time been employed by the Survey, and that no such accident took place as was reported by Mr. Bodine to have occurred to Mr. S. R. Capps.

A Comparison of Gold and Silver Production in Ontario

Gold Output Likely to Exceed Value of Silver Output by 1920

(By J. A. McRAE)

The official report of the Ontario Bureau of Mines, covering the nine months ended September 30th, corroborates in every way the figures presented from time to time during the period in these columns. The report declares that at the present rate the 1919 output will reach at least $10,000,000.

In addition to this, it is a fact that the rate of production, since the above report was compiled, has increased considerably and the current rate of output may be conservatively estimated at $1,000,000 a month. To gage the importance of this, it is of value to turn to the amount produced in the United States, where during the whole of 1918, the output amounted to $68,646,700. This seems to indicate that Ontario's gold production is now at a rate of about 15 per cent of the total of the United States. Further, that the gold mining industry in this province is new, and is recording rapid growth. In discussing the situation with gold mine operators, the hope is expressed that the 1920 production may exceed $14,000,000. Compared with this the best previous record was established in 1916 when a total of $10,339,259 was reached.

During the past thirty-three years, the gold output of Ontario amounted to only approximately $61,000,000. In order to grasp the ipmortance of the industry as at present, it is interesting to note that of the above total some $36,542,833 was produced during the five years just ending. It is a fact that the gold output of the province first passed the million-dollar mark in 1912, and it was not until after that time that the industry became one of first-class importance.

Followig is a summary of production during the past thirty-three years, the 1919 figures being based on available reliable figures:

Year	Fine Ounces	Value
1887	327	$6,760
1888	....	....
1889	....	....
1890	....	....
1891	97	2,000
1892	344	7,118
1893	708	14,637
1894	1,917	39,624
1895	3,015	62,320
1896	5,563	115,000
1897	9,157	189,294
1898	12,862	265,889
1899	20,394	421,591
1900	14,391	297,495
1901	11,844	244,837
1902	11,118	229,828
1903	9,096	188,036
1904	1,935	40,000
1905	4,402	91,000
1906	3,202	66,193
1907	3,212	66,399
1908	3,212	66,389
1909	1,569	32,425
1910	3,089	63,849
1911	2,062	42,625
1912	86,625	1,788,596
1913	219,801	4,543,690
1914	268,264	5,545,509
1915	406,577	8,404,693
1916	497,836	10 339,259
1917	420,894	8,698,881
1918	450,000	9,100,000
1919 (est.)	500,000	10,500,000
Totals	2,973,411	$61,373,887

In the gold mining areas, chief among which is Porcupine and Kirkland Lake, there is manifest a degree of enthusiasm not shared by many other gold mining areas in the world. The reason for this is that the average grade of the ore is high, and even at present high costs leaves a margin of around fifty per cent net profit. Accordingly as the forces engaged increase, the cost of operation is becoming more favorable. The Hollinger is endeavoring to add at least 900 more men to its force, the Dome another 150 men, with a corresponding demand for additional men at the other producing mines.

Two other facts, more or less of uncertain quantity, but, nevertheless, having a favorable influence, are the high rate of exchange between Canada and the United States, together with the strong agitation in America for a bonus on new gold. Large financcial interests in the Estates are now known to be accumulating a large amount of shares in the leading gold mines of Northern Ontario. In doing this they get the benefit of the rate of exchange, which, at the time of writing has reached about eleven per cent. On such shares as the Dome Mines, a saving of about $1.50 a share is made at the outset. As to the agitation for a bonus on new gold, it is exceedingly significant to note that the American Bankers' Association as well as the American Mining Congress are urging the United States Government to pay $10 an ounce for newly produced gold. That these factors will attract added attention to the gold mining companies of this country appears to be certain.

The gold mines are all well stocked with coal. Cyanide is procurable at a reasonable price and the cost of labor is quite reasonable. Taking all factors into consideration, the opinion of leading mining men has taken a decidedly optimistic turn to the end that durinf 1920 the gold output of this province may exceed the value of the silver output of Ontario.

PORT ARTHUR NOTES

(By J. J. O'CONNOR)

A serious accident occurred on the 8th instant, at the Northern Pyrites Mine, at Northpines, Ontario, which caused the death of two men, and some damage to the plan caused by the explosion of the compressed air container.

Mr. W. A. Bartlett, Inspector of Mines for the Province of Ontario, is in the city today, on his way to Dryden, Ontario, to make a complete inspection of the mine and workings of the Wachman Mining Company's operations at Contact Bay, Vermillion Lake. On his return he will make an inspection of the Federal Mining Company's silver property, in Paipoonge township, about three miles from the Rabbit Mountain Mine.

Mr. Bartlett is the discoverer of the Bartlett and Magpie iron mines, in the Michipicoten district.

Nova Scotia Notes

Cape Breton Coal Mines.

Production of coal has improved, as is the rule in the weeks immediately preceding the Christmas holidays. On one day in the week ending the 13th December, the Cape Breton collieries of the Dominion Coal Company produced the largest day's output since April 1918, namely 12,558 tons. This figure represents about two-thirds of a fair day's production for the same mines before enlistments withdrew the producers from the mines.

Apart from weather delays, it may be expected that the Dominion Coal Company's mines in Cape Breton will work steadily throughout the Winter months. Something like the normal shipping fleet of the Company should be available for water transportation next Summer, and it may be anticipated that the policy of the Company will be to stock coal during the Winter, in the intervals of loading shipping, so as to be prepared to send coal to Montreal next Summer, and regain some part of the previous Montreal custom.

A number of Conciliation Boards have been appointed to adjust the wages question outstanding between the various U. M. W. locals and the several coal companies. There seems no reason to anticipate any difficulties in the way of settlement, and if satisfactory arrangements can be cone to between the parties, it may be possible to make a wage agreement over a term of one year. It is also possible that in the case of the Glace Bay collieries that an agreement may be come to between the Dominion Coal Company and its workmen without the actual formal intervention of the Board of Conciliation.

Pictou

The official announcement of the acquirement of control of the Acadia Coal Company by the Nova Scotia Steel and Coal Company is the most interesting piece of news that has recently been given out in this district.

The Pictou coalfield is a difficult one to understand, but it is a field of much promise. During the administration of the Belgian interests, which the Scotia people have now taken over, the property of the Acadia coalfield was more thoroughly and more scientifically prospected than it had ever been previously, and Mr. Notebaert, the Mining Engineer of the Acadia Company, has proved himself to be a mining engineer of exceptional skill. It is not too much to say that the property of the Acadia Coal Company, as it has been taken over by the Scotia Company, was never in its history in better condition, more developed, or as thoroughly understood in its structural relations to the main coalfield. The capital which the Belgians invested in the Acadia properties has been invested to the permanent benefit of the Pictou coalfield, and the Belgian management did unusually good work in a coalfield of extraordinary complexity. The number of coal seams already proved in the Stellarton area controlled by the Acadia Coal Company is sixteen, but there is very reasonable possibility that others may be encountered at lower depths. Another undeveloped asset of this field is the oil-shales and oil-coals which are associated with the coal seams in much profusion. The Stellar, or Oil Coal seam (from which the town of Stellarton is named) is a case in point.

Commenting in this connection, Mr. F. W. Gray's Bulletin (Mines Department Bulletin No. 14 states:

"The coal companies are more interested in the "distillation of oil shales than is perhaps realized, be- "cause not only do the oil shales occur within the "mining areas of coal companies now operating in "Nova Scotia, but these companies have also access "to large quantities of inferior coals, coaly shales and screenings, which, at some future date may, very con- "ceivably, be found to yield a sufficient percentage "of hydro-carbons to justify the extraction of these."

It should not be forgotten that the Scotia Company itself was formerly an operator in the Pictou field, and that it still holds leases which can be advantageously linked up to the Acadia holdings.

New Brunswick.

The publicity that has been given to the Minto strike is extraordinary, considering its relative importance. Every Canadian newspaper from East to west has had head-lines about the strike at Minto, N.B., and very few of those who read the dispatches knew that the strike involved not more than one hundred men all told. So far as it is possible to gather from the newspapers, the award of the Conciliation Board does not seem to have been marked by any striking ability, and it would seem that both locally and abroad too much importance has been attached to a trouble that presented no very grave issues, and from which neither side and anything to gain by such disproportionate publicity as has been given to this storm in a teacup. The coal-mining industry at Minto is small, and can never be very much bigger because of the limited character of the coal deposit, but it is of much local importance because the single thin seam worked in New Brunswick is an isolated patch of coal some hundreds of miles distant from the nearest coalfield. The Minto people should have enough sense to compose their own differences, and take advantage of the purely local market that is all their own. Moreover, the Minto miners have mostly been brought in from the outside, with some considerable difficulty and expenditure of money, and they will not easily be replaced if they scatter. Mutual interest should have dictated a more conciliatory policy on the part of all the parties concerned, because, to the rest of Canada, despite the tremendous publicity given to this strike, whether the Minto mines work or not is a matter of relative non-importance.

THE CONVOY PORTS OF HALIFAX AND SYDNEY

"World's Work" for December contains the first of a series of articles by Rear Admiral Sims, U. S. Navy, in which are contained some interesting references to the use of Sydney and Halifax, Nova Scotia, as ports of assembly and departure for merchant-ship convoys.

To those whose good fortune it was to witness the periodical gathering of the fleets of dazzle-painted ships in Sydney Harbor and Bedford Basin, Admiral Sims' recital will call up interesting memories, and it is worthy of note that during nearly five years of war the shipping of coal and steel proceeded virtually without interruption.

As Admiral Sims states, once the convoy system was properly organized, the arrival and departure of the convoying warships proceeded with the regularity of a train service.

Special Correspondence

BRITISH COLUMBIA

Vancouver, B. C.

A company, with a capitalization of $10,000,000 is proposed for the purpose of undertaking in British Columbia the establishment of the plant necessary to smelt and refine all the ores produced in the Province. The enterprise would involve the erection of smelters for treating copper, silver-lead and zinc ores, producing the refined metals ready for the market, and supplying alloys of the same. It also would include the launching of a commercial iron and steel plant. It is understood that the project is to come before the Vancouver Board of Trade and that, in all probability, the government will be asked to provide some form of encouragement and support.

The Talpoppin Mining Company, organized in Vancouver and of which A. Wallace, a well known businessman in president, is said to have property of much promise on Burns Lake in the Omineca District. Report, which must be considered authoritative, are to the effect that there are several well defined veins carrying high silver values. The claims, however, are little known as yet to any outside those immediately interested. The latter propose carrying on development without delay and have proceeded with the construction of a road to facilitate transportation.

That he has negotiated the transfer of 16,000 acres of oil lands on the Athabaska River, northern Alberta, acquired from the Dominion Government last year, to a financially strong Eastern American Syndicate, is the statement made by Charles F. Law, of Vancouver, on his return recently from Boston and New York. This field is said to have been first explored by Sir John Richardson, of the Franklin Expedition, and a map with geological notes were deposited with Earl Bathurst, who then was Colonial Secretary. A sample of the tar sands exposed on the Athabaska River was taken to Boston and analyzed by Arthur Little & Co., chemists, and found to contain oil to the amount of 25 per cent to its cubic contents. The tar sands average 100 feet in thickness. It is generally believed that drilling back of the Athabaska River, where the covering of the sands is several hundred feet thick, will result in the finding of petroleum of high grade. Geological notes from Sir John Richardson's report, prepared over a century ago, are given as follows:

"About nineteen miles below Fort McMurray and a mile from the right bank of the river, a saline spring occurs. This spring rises from the summit of a rounded hill which is about fifty-six yards in diameter, sixty feet high, and entirely encrusted with salt deposits. This hill is bounded on three sides by the high bank of the river, which here recedes a little and forms an even round backed ridge, rising two hundred feet above the spring. A small clayey plain on the southwest side of the hill is traversed by the rivulet from the spring and opens into a bay of the river. The rock exposed is limestone.

"At a considerable distance from Calumet a limestone similar to that last mentioned occurs, having its strata waving or dipping both to the east and west. Below this there is a peaty bog, whose crevises are filled with petroleum.

"This mineral exists in great quantities in this district. We never observed it flowing from the limestone but always above it and generally agglutinating the beds of sandstone into a kind of pitchy sandstone. Sometimes fragments of this sandstone contain so much petroleum as to float downstream. The limestone dips under the water and disappears at Calumet and the pitchy sandstone cliffs also terminate there. This spot, situated about three or four miles below an old fort, obtains its name from a bed of compact marl which form a small cliff on the bank of the river and is quarried by the voyageurs for making calumets or pipes."

Hazelton, B. C.

After visiting the Silver-Standard Mine it is stated by General J. W. Stewart, who is one of the chief owners and who returned from active service in France only a few months ago, that development at greater depth will be undertaken without delay. He says that there is no doubt that he and his associates have a mine and, if expectations are confirmed by the work proposed, it will become one of the largest producers of the Province. The Silver Standard Mine has been opened up and proven to a depth of 250 feet on what was previously known as the main vein and to a depth of 125 feet on No. 4 vein. The ore as a rule is high grade but of a somewhat complex nature, requiring a little different treatment from the usual run of silver lead ores. The proper treatment, however, after considrable research, has been established. General Stewart states that it has been realized that development at greater depth is necessary and plans have been considered with the result that it has been decided to run a new crosscut, which will be about 900 feet long to cut the No. 4 vein at a depth of 200 feet. The No. 4 is the new vein which has proven a valuable ore producer. There is considered to be no reason why that ore shoot should not extend to the lower level and if it does the Silver Standard will be definitely established. When the tunnel reaches No. 4 vein a drift will be run in both directions and the tunnel then will be continued on the original main vein, cutting the latter at a depth of 250 feet. Thus the ultimate length of the tunnel will be 1500 feet. The new tunnel also will cut No. 1 vein at a depth of 100 feet. although a drift to the south probably will be necessary to get under the shoot. Up to the present No. 1 has received nothing more than a little surface development but assay returns from its ore are satisfactory. Nos. 2 and 3 veins also will be cut. The tunnelling will be done by contract. In connection with this work a 400-foot surface tram connecting the upper workings with the tunnel will be installed for the purpose, in the meantime of conveying supplies, and later for the transportation of ore. It is not the intention to make any improvements to the power plan and mill at present but when the plans outlined are complete the entire equipment will be remodeled.

Prince Rupert, B. C.

Twelve mining claims have been staked on a gold-bearing ledge extending from Lisianski Inlet to Stag Bay on Chicago Island by J. H. Cann and associates of Prince Rupert. It is stated that casual samples, taken at intervals of twelve feet along the ledge, give returns averaging $239.95 to the ton.

Kamloops, B. C.

Interests held by Messrs W. H. and G. J. Hammond in the magnesium sulphate deposits at Basque B. C., have been disposed of to eastern capitalists, $125,000

being the sum mentioned as having changed hands in the transaction. Referring to this property, which has been held and to some extent operated by the Basque Chemical Production Co., Limited, the Minister of Mines Report for 1918 quotes Charles A. Newhall, of Seattle, Wn., in part as follows:

"The examination was made on the lakes on March 8th. Considerable snow was on the ground and it was impossible to form an exact estimate as to the extent of the salts, in that we could not distinguish between the mud and the salts. In general the formation of these lakes is similar to the ones that are being worked in the district tributary to Oroville, Wn. The salts occur in pools of varying shapes and sizes; these pools being surrounded by mud-rings. The excavations made on the lakes indicate that the pools carry layers of salt to a total depth of approximately 20 feet, the salts lying in layers and intermixed with mud. These pools are more or less conical in shape, tapering off towards the bottom. In other words the greatest area is exposed at the surface. Mud to varying depths lies between the pools, and this mud in other lakes has always been found to carry more or less salts."

A number of samples were taken by Mr. Newhall, the result of the assay of one being as follows:

	Sample No. 1 Per cent.
Insoluble matter	0.76
$MgSO_4$	44.58
Water	50.84
Other soluble solids	3.82
	99.24
Epsom equivalent to $MgSO_4$	91.24

Several carloads of the product already have been shipped to Eastern Markets, where the demand, evidently, is gratifying. The force employed recently was increased and, with the change in management, it is stated that the facilities for increasing the output materially are to be provided.

The deposits are situated in the Dominion Government Railway Belt, only a short distance from the main lines of the Canadian Pacific Railway and near the Cariboo Road between Spence's Bridge and Ashcroft. The property includes five lakes.

Nelson, B. C.

The Utica Mine of the Ainsworth Division has not been operated for some time but T. J. Poyntz, formerly superintendent, has not lost faith in the property. Working a portion of the old workings he recently made a strike of high grade silver-lead ore and now is socking a quantity of the best for shipment. It is not unlikely that some action will be taken to develop this mine further as it is the opinion, in well informed quarters, that it has not been exploited to the limit of its possibilities. The Minister of Mines Report of 1918 shows that the Utica was operated for three months in that year, that 222 tons of ore were shipped, and that tonnage yielded 13,661 oz. silver and 10 tons lead.

Hon, John Hart, provincial minister of finance, was requested, while in Nelson recently, to submit legislation to the Provincial Legislative Assembly at its next Session, providing for the amendment of the Taxation Act in such fashion as to grant a more liberal form of relief to operators of gold mines. Under the Taxation Act of 1918 a gold mine is deemed to be a mine whose gold recoveries amount to 85 per cent or more of the total value of the metal content of the ore. Mines coming within this classification are exempted from the 2 per cent tax on output in recognition of the unfavourable condition of gold in the market. Representations were made to Mr. Hart than it was at the time of the enactment of this legislathat the position of gold now is more unfavourable tion and that the advance in silver made it difficult for any gold property having even a very small proportion of silver in its ore values to come within the 85 per cent definition. It was stated as an example that $17 gold ore, containing even 2½ ounces of silver at the present price, fell outside the exempted category, yet the property was essentially a gold property. It was held, as a matter of fact, that very few purely gold properties can operate under present conditions. Mr. Hart was requested to revise the definition of a gold property downward, in order that the class of poperties it was intended originally to benefit might come within the classification.

Trail, B. C.

Fire destroyed the copper mill of the Trail Smelter, Consolidated Mining and Smelting Co., Ltd. of Canada, recently and the company, losing no time, now has the necessary repairs in hand. It is announced that the misfortune does not necessitate the suspension of copper ore shipments to Trail for treatment. The lead mill is being re-arranged and, pending the completion of the new copper mill, copper ore will be crushed at the lead mill. The latter, of course, also will take care of lead ore.

Ore receipts in gross tons for the week from November 15 to 21 inclusive at the Consolidated Mining and Smelting Co.'s Smelter, Trail B. C. totalled 4,648, the aggregate tonnage for the year to date being 289,816. Of the independent shippers the chief contributors were: Florence, Princess Ck., 153 tons; Josie, Rossland, 318; Mandy, Le Pas, Manitoba, 156; Paradise, Athalmar, 41; Rambler-Cariboo, Rambler, 52; Standard, Silverton, 199; Van Roi, Silverton, 41; and Whitewater, Ratallack, 40. The Centre Star Mine, Rossland, was the principal shippers of the company properties with 1876 tons while the Sullivan Mine, for the first time for weeks, shows a shipment of 259 tons of zinc ore. This, however, does not mean that the strike is at end.

Stewart, B. C.

That the first shipment of ore from the Premier Mine still is at Hyder, Alaska, awaiting shipment is the statement of P. Daly, who took it out under the terms of a lease he had from O. B. Bush in 1915. He was working the property then on a royalty basis. The ore was sledded to tidewater. Mr. Daly says that there are about eight tons which assays around $200 a ton. He will send it to the smelter as soon as transportation is obtained.

There is no doubt of the sentiment of mining men who have visited the various camps in the Salmon River section as to their future. Without exception they are enthusiastic. Dr. M. W. Bruner, who has just returned, deserибes it as the most wonderful mineral belt he has ever seen and looks forward to seeing a railroad constructed up the Salmon River. Charles F.

Caldwell, the well-known British Columbia operator anticipates much development in the Spring and states that the mine owners propose tackling and solving the transportation problem.

Alice Arm, B. C.

Major A. W. Davis, the mining engineer who has had charge of the operations of the Dolly Varden Mine, has left the employ of the Taylor Mining Company and has gone into private professional practice in Vancouver, B. C.

The Dolly Varden Railroad has been closed down for the Winter, the locomotives and rolling stock being placed in roundhouses where they will be overhauled preparatory to the new year's work.

Operations at the Mine will be continued through the Winter so that when the railroad is opened there will be a large quantity of ore on the dump for shipment.

Communications will be kept open for the distance of 17 miles between tidewater and the Mine by means of dog teams.

Nelson, B. C.

While the output of the East and West Kootenays may not be as great this year as last it is the opinion of Fred. A. Starkey, secretary of the associated Boards of Trade of Eastern British Columbia, that the mining industry has never been more active or given such promise of sound development.

Referring to the Sandon District he points out that the ore body recently discovered on the Silversmith Property carries high values and is said to be most important. The development of the Noble Five and the Reco, and the erection by the operating Company of a 1500-ton Mill, are mentioned as incidents of a gratifying nature. He speaks, also, of Clarence Cunningham's new mill, which is running at full capacity treating the ore of the Queen Bess, Sovereign, Wonderful and the Alama-Idaho Mines. The Canadian, Adams, and Ivanhoe Groups as well as the Surprise and Bosun are being vigourously developed by the Roseberry Surprise Mining Co.

Mr. Starkey mentions as being under development and as having, in some cases made shipments, the McAllister, Ocean, Van Roi, Silverton, Enterprise, Neepawa, Molly Hughes, Black Prince, Ottawa and Evening Star, The Standard, it is explained, is being further opened up and has been shipping zinc concentrates.

In the Kaslo District the Cork Province has been reorganized in order to raise finances for further development of large ore bodies at depth; also to acquire more water power which is needed for the milling plant. The Silver Bell, Index, Gibson, Flint and other properties are also under development. All these are new prospects opened within the last eighteen months. The Old Blue Bell, the oldest mine in the Country, the Ainsworth, Florence No. 1 and several others have been shipping.

The same rate of progress is being made in the Lardo District, where the White Water, Comstock, Bannockburn, Bullock, Silver Cup, Tenderfoot and others are expected to be among next year's shippers. Sheep Creek is well ahead with development and the Queen and Nugget are getting close to the point at which it is expected to encounter the main vein at depth. The cross-cut which was made in the former mine and which went through schist is only now 400 or 500 feet from the quartz.

The East Kootenay has shown marked improvement, the North Star, Paradise, Victor and several others having made shipments.

Slocan, B. C.

The Silver Glance Property, Bear Lake, has been bonded and will be developed quite extensively by the new owners. The vein is in granite and is a true fissure about 25 feet in width, coursing north and south, dipping about 60 degrees to the East Two heavy guage seams are on foot and hanging walls, the territory between being crushed granite cemented with quartz, which carries the values. Compressed air will be used in development and it is planned erecting a mill to treat the ore by flotation.

Owners of the Index Mine have acquired the Flint Claim, on which some development has been done with satisfactory results, the consideration being about $22,500. The Government Mining Engineer in 1817 reported that "a nice showing of one foot of solid ore averaging 100 oz. silver and 65 per cent lead" had been opened up. Since then some work has been done. It is understood that operations are to be carried on through the Winter.

Vancouver, B. C.

Maurice D. W. Bacon, of Los Angeles, Cal., has filed suit in Spokane, Wn., against B. K. Neill, of Spokane, for a half interest in the Premier, formerly the Bush Mine situated near Stewart, B. C. It is asserted by Mr. Bacon that a partnership existed between him and Mr. Neill; that the value of the Bush Mine, as it then was termed, was misrepresented to him and that Mr. Neill thus obtained possession. Mr. Neill states that there is n ofoundation for the claim made.

Since the report of a large deposit of limonite ore being found on Whitewater Creek, Lillooet District, there have been inquiries and press announcements which, while not of a definite character, indicate that interest has been roused in the possibility of establishing an iron and steel industry.

Requests for information as to the extent of the deposit referred to, and as to the magnetites of the Coast, have come from various sources. English capitalists, mining men interested in the Orient who state that, owing to unfavorable conditions there, they might be induced to move to British Columbia if reasonable encouragement were given, and Provincial financiers have been sending out feelers and compiling data as to the prospects. In short it would appear now that, should the investigations that are to be initiated in the Spring in connection with the Whitewater Creek ores, prove satisfactory the commercial development of this deposit will follow.

As an instance Percy Scott Leggatt, director of Thomas Summerson & Sons, railway owners and car builders of Darlington, England, is quoted as stating that his firm is considering launching an iron and steel industry here. His firm is interested in smelters and refineries in England.

Mr. Leggatt evidently is satisfied that the ore necessary is available. He seems to be impressed with the possibilities of the electric furnace but says a first necessity is cheap power supply.

Experts have been conducting experiments with iron ore samples from different parts of the world on behalf of Summerson & Sons and the specimens from British Columbia, and especially those from Texada Island, are said to be suitable.

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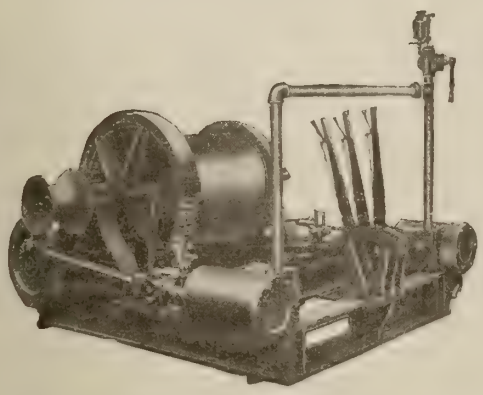

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Victoria, B. C.

The oil possibilities of territory within the Peace River District, and adjoining Dominon Lands in the same area, are declared to warrant further investigation by Hon. T. D. Pattullo, Minister of Lands, in the British Columbia Government. Mr. Pattullo's statement is based on the report of Professor J. C. Gwillim, who conducted a party into the Country in question last Summer on behalf of the Government, an appropriation of $50,000 having been made to permit of inquiry being made into the resources of the Peace River Section in respect of coal, petroleum, and natural gas. It is likely that a larger sum will be asked for at the forthcoming session of the legislature to permit the work to be continued.

The Standard, the Shell and the Anglo-Canadian oil companies are showing strong interest in the oilfields of the Great Slave Lake and Peace River District of the Canadian Northwest. Representatives of the Anglo-Canadian Company who are in Ottawa believe that there will be important developments in reference to oil production in the next few years.

A large movement of prospectors, well equipped for their work, is predicted into the northwest with the opening of navigation on the northern waterways. Anticipating this mounted police posts are being established.

The Standard Oil Company and the Angla-Canadian Company are understood to have secured leases covering considerable tracts of oil lands in the vicinity of Great Slave Lake. The former will send two outfits and the latter one to the ground to make tests.

The Shell Oil Company is understood to have several survey parties at work in possible oil fields situated in the Province of Alberta.

Princeton, B. C.

The property of the Princeton Mining and Development Company, situated on the Similkameen River about four miles from Princeton, is to be re-opened. A bunkhouse is under construction and early in the Spring a compressor is to be installed, after which drilling will start. Work done so far has given satisfactory results, a carload of copper ore shipped last summer having encouraged the owners.

Trail, B. C.

Ore receipts in gross tons for the week from November 21 to November 28 inclusive at the Trail Smelter of the Consolidated Mining and Smelting Co. totalled 7,708 tons. The chief independent shippers were the Alamo, Alamo, 107 tons; the Josie, Rossland, B. C., 721 tons; the Mandy, Le Pas, Man., 156 tons; the north Star, Kimberley, 316 tons; the Standard, Silverton, 403 tons. Of the company's properties the main contributories were the Centre Star, Rossland 2907 tons; the Emma, Eholt, 479 tons; the St. Eugene, Moyie, 1507 tons; the Sullivan, Kimberley, 858 tons.

WANTED—A competent man with experience covering the principal departments of electrolytic copper refining. Must be prepared to go to Europe if necessary. State terms in application, also experience in design construction and operation, giving references. Mark envelope "Application" and address to W. J. Forrester, Imperial Bank Chambers, Leader Lane, Toronto.

NEW PLANT OF CANADIAN NATIONAL CARBON COMPANY AND THE PREST-O-LITE COMPANY UNDER ERECTION IN TORONTO.

The Canadian National Carbon Company, Limited and the Prest-O-Lite Company of Canada, Limited have jointly purchased the westerly ten acres of the property at the south west corner of Bathurst and Davenport Road in the City of Toronto, known as the Hillcrest Driving Park, as a site for a large new manufacturing plant.

The Canadian National Carbon Company are manufacturers of the well-known Columbia and other dry batteries, Cilumbia storage batteries, Eveready "Daylo" flash lights, Carbon brushes for electrical machinery, Electrodes, etc.

The Prest-O-Lite Company of Canada, Limited are manufacturers of the Prest-O-Lite storage battery, Prest-O-Lite welding and cutting apparatus, Pest-O-Lite Dissolved Acetylene, Prest-O-Lite gas tanks, lamps and other automobile lighting and starting accessories and apparatus.

The new plant which is to be erected in Toronto at once is the largest manufacturing establishment erected in Toronto for several years and will consist of two buildings, one of which will be 80 feet wide by 400 feet long, two storeys high with one section 80 x 80 three storeys high, to be occupied by the Canadian National Carbon Company, Limited while the second building for the Prest-O-Lite Company will be 80 feet wide by 400 feet long and two storeys high.

The heating plant will be housed in a separate structure, 50 x 60 and will have room for installation of additional boilers for future units to be added.

All the buildings will be of re-inforced concrete frame, flat slab floors, mushroom type columns on twenty-foot centres, steel sash and brick curtain walls.

Each building will have two freight elevators and all toilet accommodations and stairways will be contained in towers erected on outside of buildings, thereby removing any obstructions which might interfere with manufacturing operations.

Arrangement is provided for special rest rooms for female employees, shower baths, a dispensary with competent medical attendant to look after any injuries to employees; restaurant with modern, equipped kitchen in charge of a competent Chef where meals will be cooked and served to employees at bare cost. In fact, both companies propose to make the new plant by removing any obstructions which might interfere the owners but for its employees

The plant will be served by two switch tracks operated under a joint agreement between the Canadian Pacific and the Canadian National Railways.

It is expected that the plant will be ready for occupancy in May 1920 and everything possible will be done to get it ready my that time.

At the present time the two companies are operating five plants at different locations in Toronto but owing to the large demand for their goods have been unable to fill orders for some time past and propose now to get facilities which will enable them to take steps now to get facilities which will enable them to take proper care of their customers.

Mr. R. H. Combs, who has been General Manager of the Prest-O-Lite Company for the past three years and who was also recently appointed General Manager of the Canadian National Carbon Company, states that his companies expect about five hundred people as soon as the new plant is ready to operate and that the facilities provided by these first two units will take care of upwards of 700 employees if needed. "We have secured enough ground" says Mr. Combs, "to enable us to put up six such units as the two which are now being built but before adding new units, both the present units will have a third storey added, as the buildings are being erected to carry three full floors."

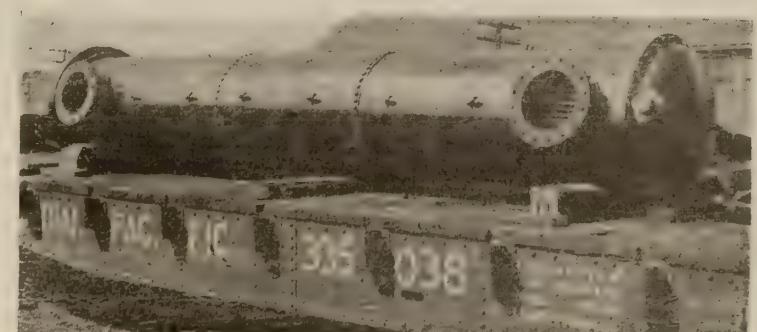
In addition to the large plant described above, Mr. Combs states that the company will erect in the Spring, a new acetylene gas plant in Toronto or immediate vicinity, to take care of the greatly increased demand for compressed Prest-O-Lite gas for welding and cutting and that a large new storage battery warehouse and assembly plant will be erected at Winnipeg.

The contract for the large Toronto plant has been awarded to Messrs Wells & Gray, Limited, of Toronto, a purely local, Canadian Company, who have in the past few years executed some very large contracts for large American and Canadian Companies, such as the Wm. Davies Co.; Canadian Pacific Railway and H. Walker & Son, two of their notable jobs being the large plant of the Ford Motor Co., Ltd., at Ford, Ontario, and the large new plant of The Peters Cartridge Company at Cincinnati, Ohio, where they gave a rare demonstration of Canadian aggressiveness in the construction of a great plant in record time right in the midst of big American contractors who tried hard for the contract.

WANTED.

CHEMIST, American, desires position. Several years experience in blast-furnace work, besides steel, ores, electrolytical processes, food products, etc. Best of references. Box 3, Canadian Mining Journal, Garden City Press, Ste. Anne de Bellevue, P.Q.

STEEL PLATE WORK OF ALL KINDS FOR MINES—Particularly



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:-: EDITORIAL :-:

INDUSTRIAL HOUSING.

A writer in the Boston "Financial Bureau" draws attention to the tremendous programme of building now in course of development in the United States, and deplores the fact that the percentages of construction of industrial plants is out of all proportion to the provision which is being made for housing the workers. He says that large industrial expansion creates an additional demand for labor which must be brought into the locality. If there are not adequate housing facilities for this imported labour, "the community is immediately in possession of a very sinister social problem—a housing problem. The higher-paid men bid the lower-paid men off their feet, the number of persons per room is increased, and sanitary and moral conditions consequently lowered; everyone is paying more than he can afford for rent, and there is a constant floating population which is unable to get accommodation, because none exists. This inevitably breeds discontent, and fertilizes the ground for the clap-trap radical orator."

One of the most noticeable features of the financial pages of Canadian newspapers in recent months has been the large number of new incorporations, the tremendous projection of United States interests into the Canadian field, and the great number of new factories mooted for Canadian industrial centres. It is equally certain that nothing like the same proportionate activity marks the erection of moderately priced houses, and, as everybody knows, the housing problem in Canadian towns and cities is sufficiently grave already.

The duty of providing houses for workmen should go side by side, and should be accepted by employers of labour as part of the necessary expenditure for industrial extensions. If this duty is not undertaken, the employer suffers in many ways. As the writer previously quoted says:

"A floating labour class inevitably increases the "labour turnover of a factory. Nothing will run up "factory costs quicker than a constantly changing "personnel, no one offers the I. W. W. agitator a more "inviting field than the roving workman, who lives in "a barrack or a boarding-house, and has not a penny-"worth of permanent investment, because it is not "portable."

It is becoming more and more realized that the I. W. W. trouble in the Western States of the Union is the outcome of the formation of a class of "landless men" brought about by the seasonal work periods of the harvest fields, lumbering and other industries that do not offer men a permanent home or steady employment. There is much reason to believe that Bolshevism, with all its hideous consequences, was born in the I. W. W. circles of the United States, and the policy of United States employers of labour, possibly unconsciously, is not blameless in the creation of this class of roving, landless, homeless men, who naturally follow the age-long path of the Ishmaelite.

One shining example of the opposite tendency is the policy pursued in housing by the Granby Consolidated Co. at Cassidy Mines, already described in this journal Such faith and vision cannot fail of its just reward.

Canada is not a country for "landless men". The climate discourage aimless migration, and our per capita wealth and great natural resources allow no legitimate excuse for the growth of such a class. But there is a grave danger of the growth of slums in Canadian cities. Indeed, they already exist, as bad and as vile as can be found anywhere.

It should not be forgotten that anarchy, civil discord, and mob rule in its most pitiless and hideous aspect, lurks and awaits its opportunity in every slum. We do not want in our Canadian cities areas from which—should for any reason the civil rule of ordered justice be paralysed, as we have seen it so happen not long ago—there will emerge the original anarch, with no stake or joy in life, to wreak destruction on peaceful homes of more fortunate people. Such areas are, however, in process of making, although there is neither necessity nor excuse for their existence.

The Editor of "Mining & Scientific Press" commenting on the confessions of the German criminals who caused the war, writes: "These German confessions ex-"hibit an entire absence of sorrow for the sufferings "brought on humanity by the war; instead, there are "repeated expressions of chagrin that the great piratic "scheme failed, and a regretful rumination over the "factors that made its success impracticable, with the "suggestion that next time there must be no such "blunders. The German leaders are entirely unre-"pentant of their crime, the details of which they "themselves have exposed. They justify the judg-"ments formed in the early months of the war, on the "basis of the information then available, and they show, "how, under an autocratic regime, a few men can play "fast and loose with the fortunes of humanity."

Mr. Rickard, in his last sentence, concisely sums up

the initial cause of the war. Three great adjacent empires were ruled by three men, one a fool, one a weakling, and the other an old man in dotage. The inevitable happened, and it was to prevent such a thing happening again that the League of Nations was conceived.

Why the conception should have failed of realization may be understood by the citizens of the United States, but is causing much bewilderment among other peoples. However, a good cause must eventually succeed, and we have great faith in the ideals of the people of the United States, because they are largely those of our own nation.

Mr. Balfour has exquisitely phrased the general feeling of the British peoples in this matter. He said: "The part of the United States in the war was noble "and disinterested, with no thought of national ambi- "tion. I had dreams that a work so nobly begun would "be effectively carried through." So had we all. And after all our hopes were only dreams.

MINSTERS OF MINES.

The Cobalt "Mining Review" remarks that the recent visit of the new Premier of Ontario, accompanied by the new Minister of Mines, "did not serve to allay the fears that the new appointment may not prove to be beneficial."

There can be no two opinions about the wisdom of the creation of a new portfolio concerned with mining and with nothing else. This action of the new Ontario government is one that should be followed by a similar concentration of ministerial duties in the federal cabinet.

As to the choice of a minister of mines we advance the opinion, with which, on principle, we do not see how the United Farmers of Ontario can quarrel, that the proper person for such office is a man who, firstly, should be a properly qualified mining engineer, and, secondly,, should never have been in "politics" as that elastic term is commonly understood amongst us. Possibly this opinion will be regarded as too advanced—or shall we say—too elementarily correct, even for the U. F. O. We have never been able to understand why the responsible ministers of state should be chosen from amongst those who have been prominent in electoral activities, and are also inclined to believe that a minister of agriculture should be a farmer, a minister of finance, a financier, a minister of education, an educationalist, or, in short, that those who direct technical department of state should know something about the things they are going to direct.

Of course, we know that it will be said that we are ignorant of the first principles of popular control of government through electoral channels, or, less elaborately phrased, that we do not know the first thing about politics. The statement would be quite correct, but, admitting it, what does a minister of mines need to know about politics? If he knows something about the nature and operation of mines is not that the main desideratum?

BURSARIES FOR MINING & METALLURGY STUDENTS.

Elsewhere in this issue will be found an account taken from the "Industrial Australian and Mining Standard" of the generous assistance that has been given by mining companies and individuals interested in mining to the foundation of bursaries for students of mining and metallurgy. While a commendable commencement has been made in this direction in Canada, thanks to the bounty of the International Nickel Company and the Granby Consolidated Company, we do not recollect hearing of such an organized movement in Canada for the assistance of students as appears to have gathered way in Australia.

Here is an excellent opportunity for the many Canadian who have become wealthy through the yield of Canadian mines, an opportunity not only to show a spirit of gratitude for the good fortune which has befallen themselves personally, but to ensure greater monetary rewards for the future, for themselves may be, and certainly to Canada at large, because—and this is a point that cannot be too strongly urged—Canada is so little prospected, and her mineral values are so little understood, that the reward of the future will always be in exact proportion to the effort expended in scientific research upon our mineral occurrences. Science cannot progress without students, and scientific investigations cannot be carried to final success without monetary assistance.

UNIVERSITY BURSARIES FOR MINING AND METALLURGY.

Towards the end of 1915, following the suggestion of Mr. W. S. Robinson, a movement was initiated with the object of providing a fund whereby bursaries and scholarships might be offered to mining and metallurgical students in Australian Universities. In 1916-17 a sum of £5,400 was subscribed for the purpose by the following companies:—Amalgamated Zinc (De Bavay's); Broken Hill Proprietary Block 14; Broken Hill South; Electrolytic Refining and Smelting; Adelong Gold Estates; Cock's Pioneer G. and T. Mines; North Broken Hill; Mount Morgan G. M. Co.; Mount Lyell M. and R. Co.; Zinc Corporation; Hampden-Cloncurry Copper Mines; Broken Hill Proprietary Block 10; Sulphide Corporation; and the British Broken Hill Proprietary Co. This sum provided an income sufficient to allow of two bursaries of £60 each being offered to the University of Melbourne in 1917, and of a further two bursaries of like amount to the University of Adelaide in 1918. These bursaries are awarded and paid to successful students in two instalments of £30 each, at the beginning of the 3rd and 4th year of their courses, and carry a scholarship on any one of the companies' mines for one year following the completion of the University course, and a salary of £150 is paid to the successful students for that period. Provided the student responds to his work, the companies agree to obtain a suitable posi-

tion for him at an initial salary of not less than £250 per annum.

Notwithstanding that the movement was started during the war period, when so many of the most promising students had enlisted and were serving their country abroad, it proved so successful as to warrant further sums being subscribed to allow of similar bursaries and scholarships being offered to the Universities in the other States of the Commonwealth. An appeal was made to the boards of the various companies, to which a most gratifying response was made, the result being that the fund was nearly doubled. Included in this response was a donation of £500 from Howard, Smith, Ltd, on behalf of the Caledonian collieries, thus bringing this coal proprietary within the benefits to be derived from the scheme. The provision of these additional funds will permit the Board of Trustees to extend their efforts, and bursaries and scholarships on similar conditions are now being offered to the Universities of Sydney, Brisbane and Hobart. This will almost absorb the income from the invested funds. Already a number of the students who interrupted their studies at their country's call have returned, or are returning, and the inquiries show how much the scheme is appreciated. Of returned soldiers, one has been awarded a bursary, and three have been placed in positions almost equal to the scholarship. The bursaries and scholarships are awarded on the recommendation of a selection committee in each State, consisting of two professors of the University of the State, two nominees of the Trustees and a nominee of the Australasian Institute of Mining and Metallurgy.

It is felt that this bursary and scholarship fund is still incommensurate with the importance of the mining, and metallurgical industries of the Commonwealth, and it is hoped that further contributions will be received so that the scheme may be extended, not only to the Universities, but also to the various Schools of Mines and Technical Colleges outside the sphere of the Universities. The companies which, so far, have not contributed to the fund may yet do so, as the advantage of having highly-qualified young men available for special technical and research work must sooner or later be realised. As showing the changing attitude to technical education abroad, it may be stated that, quite recently, four British oil companies operating in the East subscribed £200,000 to endow a Chemical School at the Cambridge University—a munificent donation, which sum was increased by £10,000 by a generous donor, who wished to convert the pounds into guineas. The hon. secretary of the movement is Mr. F. G. T. Nicholas, of 56 Queen-street, Melbourne, who will gladly answer any inquiries.—Industrial Australian and Mining Standard

Mining Personals

Alfred R. Whitman, mining geologist, is spending a week in Cobalt in connection with a geological survey at the Genesee property.

Geo. J. Miller of the Miller Independence Mine is in Dayton on business.

L. C. Campbell, of the Lumsden Mine, has returned to Montreal after paying a visit to the property.

W. L. Penick, until recently connected with the Salt Lake City office of the Hardinge Conical Mill Company, has been advanced to the position of Northwest Sales Manager, and has gone to Spokane, Washington, to open a new branch office for the Hardinge Conical Mill Company.

BOOK REVIEW

ELECTRIC MINING MACHINERY: by Sydney F. Walker, author of "Electricity in Mining. Isaac Pitman & Sons, Ltd., London and New York. Cloth, 8 by 5½ ins., 374 pp. with index. Illustrated. 12/6 net.

Mr. Walker's work on "Electricity in Mining" was one of the pioneer works on the application of electricity to mining operations, and a comparison between the new work now issued by Pitman & Sons and the earlier book will show what great strides have been made. Mr. Walker, in the preface, writes, with correctness, that electric science advances day by day, and that it is impossible to be quite sure that everything which is on the market has been included in his book. Mr. Walker also urges the importance of employing competent electrical engineers in mine plants where large use is made of electric machines, and pleads for a recognition of the necessity to pay adequate salaries if employers are to obtain the services of really competent electricians. As all mining engineers know, to their sorrow, there are electricians and electricians. Modern electrical machinery is above all efficient. If electrical engineering applied to mining has a fault, it is in the tendency of manufacturers to take undue advantage of the nice calculations which are possible in electric machine design, and not to make sufficient allowance for the special conditions under which mining machinery must operate. This tendency makes the employment of competent electricians all the more necessary.

The book discusses the merits of various prime movers, favoring the steam turbine in general, but going fully into the use of gas producers and gas engines where the presence of suitable materials, or waste gases, indicate economy in the use of this form of primary power.

The lay-out of an electric generating station for a group of mines is explained, as also a suitable lay-out for a single mine.

The principles and design of modern electric generators and machines is made the subject of a number or chapters, and much attention is paid to the problems of transmission, the regulating of pressures and the use of measuring instruments, which Mr. Walker intimates, mine operators have shown some backwardness in installing.

Especial attention is devoted to the insulation and support of mine cables, a matter of very great importance under the conditions of strain and damp surroundings that transmission cables in mines are often subjected to. Mr. Walker mentions that aluminum is coming into favour as a conductor metal as the quantity manufactured is increased, because of its lightness. The question of weight in mine cables is important, where these have to be led down vertical openings, and require strong support.

The subsidiary uses of electricity are gone into in individual chapters. The chapter on portable electric mining lamps does not include any references to the cap type of lamp with Edison battery that is now so largely used on this side, and mentions that the hand lamp of the Ceag type is regarded as the standard in British practice. Electric winding, or what is known as electric hoisting in North America, is described, as are also the forms of electric haulage used underground. Significantly no mention is made by Mr. Walker of the trolley-haulages that are so

much used in the United States, and their adoption in English mines is unlikely. In coal mines, of course, their use is forbidden, although some of the original types of trolley locomotives have been used in British mines where gas was absent. The adaptability of electricity to secondary or auxiliary haulages is pointed out.

Electrically driven mine pumps, or ram and centrifugal type are described. Mr. Walker prefers the ram type of pump where small quantities of water have to be delivered against high lifts. The use of centrifugal pumps, electrically driven, is well adapted for emergencies.

In connection with the electric drive of air-compressors, Mr. Walker writes:

"Electricity has not completely superseded com-"pressed air, principally because of the dangers of "sparking and the ignition of gas, which mine man-"agers fear very much. With the steady increase in the use of electric drive in mines, the question of the "driving of air-compressors has naturally come up, "particularly as for some time past now the practice "has been introduced of driving air compressors "underground, as near to the apparatus that is to use "it as is safe, the compressed air being taken from "there to the working face, or wherever it may be "required."

This reference has an interesting bearing on the working of undersea coal areas remote from the point of entrance of motive power, and electricity appears to be the only suitable motive power in these circumstances.

The operation of ventilating fans by electricity is mentioned, and a full chapter is devoted to electrical coal-cutting machinery. Electric signals are discussed at length, and the final chapter is on shot-firing in mines. "In the earlier days of electric lighting," says Mr. Walker, "shots were fired from the lighting "service, and according to reports from America, "this is still done the practice in some districts. The "practice cannot be too strongly condemned, quite "apart from the Coal Mines Regulation Act."

Mr. Walker's book does not discuss the objections to the use of electricity underground in coal-mines, and it would have added much interest to the book if the author had found it advisable to detail at length the objections of mine managers to the use of electricity underground, and as far as possible to reassure them. In coal mines, at any rate, the more extended use of electricity is hindered by some uncertainty and probably a good deal of misconception as to the perfection to which more electric machinery has been brought. If makers of electric machinery can provide devices that can be safely used in the presence of gas and air there is no reasonable limit to the use of electricity underground, even to the supersession of all other forms of motive power now known.

ASBESTOS, and the Asbestos Industry, by Leonard Summers, 5 by 7 ins. Cloth, 107 pp. with Index. Illustrated. Price 2s. 6d. Sir Isaac Pitman & Sons, London and New York.

This little volume is the latest addition to Messrs. Pitman's series of treatises on "Common Commodities and Industries" which now includes about twenty-five volumes.

The writer mentions in the preface the paucity of popular literature dealing with asbestos, and in this connection we may mention that this "Journal" has recently had its attention called to the scarcity of Fritz Cirkel's monograph on Asbestos published by the Mines Branch at Ottawa. In view of the great development that the asbestos industry has undergone in the war period, and the additional uses which are every day being found for asbestos, we would suggest that either the Mines Department of Quebec, or the Mines Branch at Ottawa should consider the publication of a monograph on asbestos, dealing not only with its occurrences in Canada, but with the tremendous variety of uses to which this interesting mineral is now put, similar to the monograph on "Cobalt and its Uses" recently issued by the Ontario Mines Department.

Mr. Summer's volume places Italian asbestos before Canadian in point of quality, but mentions that 80 per cent of the asbestos put to commercial uses in the world to-day comes from Canada. The statistics of asbestos production in the world are not complete, and only bring Canadian production up to 1908, mentioning that probably the Canadian output is now double what it was in 1908. The actual figures, as given in the preliminary figures for 1918, show that in this year Canada produced 141,463 tons of asbestos and 16,734 tons of asbestic.

An interesting resumé of the history of asbestos is given, in which it is mentioned that to-day the Amalgamated Asbestos Corporation of Canada operates mills with a capacity of 5,000 tons daily, employing 12,000 to 14,000 persons.

It is mentioned that fine quality asbestos can be spun in strands to weigh less than an ounce to the 100 yard length, and that fine cloth can be made from the fibres weighing only a few ounces to the square yard.

The uses of asbestos mentioned in the volume include steam packings and pipe-jointings, boiler insulating materials, fire-proof paints, theatre curtains, building materials, roof coverings, portable houses, lamp wicks, safety lamp gaskets, cord and twine, fire-ladders and ropes; protective clothing, such as leggings, spats, aprons, gloves, etc., used in processes where the workmen are subjected to great heat; various forms of electric insulation, fireproof asbestos papers, and a variety of things, which like the auctioneer's announcement are "too numerous to mention."

It is mentioned that the ex-Kaiser possessed a portable asbestos cottage, which indicates some prescience on his part.

Although this little volume is confessedly elementary and is largely devoted to mentioning the trade uses of asbestos, upon reading it, one realises that the future of asbestos is only beginning, that the variety of its possible uses is immense, and that Canada, occupying such a dominating position in the asbestos market, may very well look forward not only to a greater production of the raw material, but to multiplication of the industries concerned with the manufacture and marketing of asbestos in finished form.

To those who work in the asbestos industry, or are financially interested therein, this little handbook will bring much interesting and suggestive information.

The Use of Portable Rock Crushing Equipment at Mines

By F. A. McLEAN.

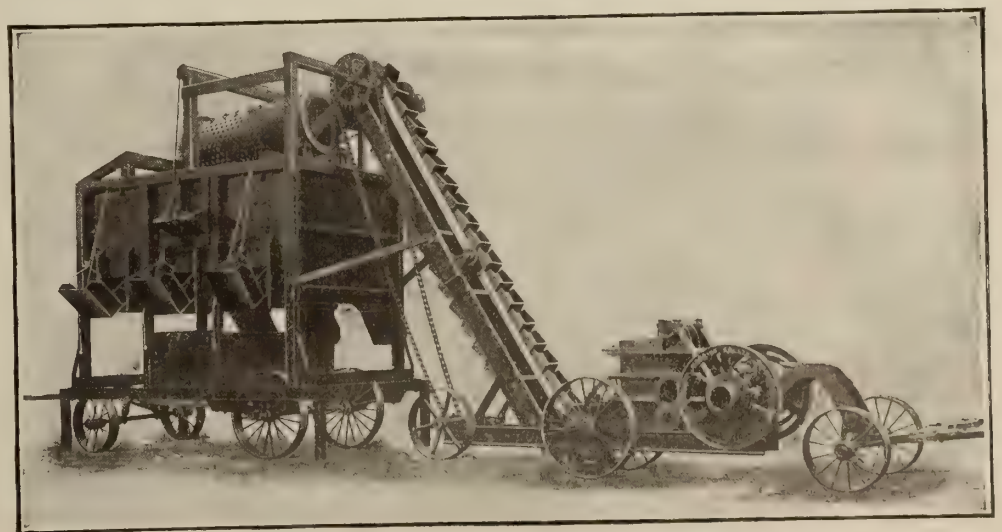
There are few things to be regretted more than the poor condition of mine roads in many parts of the country, which, due to improper drainage, or the use of too soft or porous metalling material, become a pasty and sticky mass soon after a heavy rain, requiring the expenditure of a great deal of time and money to keep them in decent order. There are not many places where a good solid sandstone or limestone ballast would not help matters to a large extent and prevent considerable trouble and loss of time, which often occurs through having to wait for a wagon heavily laden with much needed supplies to be extracted from the mire; requiring the use of horses and men who could be employed to much better advantage elsewhere about the mine.

While in many places the rock removed from the workings is well suited to the construction of good roads, and may often be the nearest source of good road-metal available to the municipalities in the surrounding country, unfortunately there are some mines in which the rock taken out is entirely unfitted for this purpose. It is sometimes possible where this condition exists, to quarry a good grade of stone from the hills adjacent to the mine and where this is not feasible, rock of the required quality can often be secured from the surface of neighboring farms. The presence of large quantities of stone on these farms reduces their productive capacity to a large extent, and the farmers—after decorating their land with numerous rock piles and large stone fences—are glad to haul some of this stone to the mine for a very small sum, sometimes less than their time is actually worth rather than have an otherwise idle team of horses on their hands, and in order to clear part of their land which they wish to bring under cultivation.

Stone of this kind is particularly valuable for the construction of permanent roads as, due to the years of exposure, all soft clayey or shaley substances have long since been washed away, leaving the remaining rock durable and well suited for the purpose; and being of moderate size, it usually requires a minimum amount of crushing to render it fit for use either on roads, or in the form of an aggregate for concrete work. Whether the rock is obtained locally or brought in from a distance, it is likely to require some crushing before it can be used either for road ballasting or for concreting around the mine, and can often be run through the regular mine crushing plant, although it will generally be found far more convenient to the use for this one of the small portable rock crushing outfits now on the market, for this purpose.

While the latter type is usually associated in the minds of most people with municipal paving, and contracting jobs—on which it has made a name for itself—its possible field of utility around the mine may at first glance seem too limited to warrant its purchase by any but the largest mines, but when one considers how much more conveniently it can be moved from one place to another wherever crushed stone for roads, mine tramways, or concreting is required it is readily apparent that, in many cases the savings in time which result from its use will soon offset the cost of installing the necessary equipment. That this is true under the high cost of labor prevailing to-day, will be borne out by anyone who has ever had occasion to watch a gang of men engaged in breaking up rock by hand on a hot summer's day.

A type of portable crushing equipment which is particularly adapted to stand up under the hard knocks likely to be met with on this class of service, and which is at the same time as compact in construction and as light in weight as is consistent with the required strength and reliability, is shown in the accompanying illustration. This crusher is of an improved type the weight of which has been materially reduced by the use of steel castings wherever possible without any decrease in strength. The crusher is mounted on a steel truck, equipped with wide-tread wrought-iron wheels, and the truck frame is hung from the rear axle and connected to the front axle by side plates curved in such a way as to keep the centre of gravity low and make it easy to block up the wheels when the crusher is in operation. An extension of the frame is arranged to carry the elevator and its drive. The frame of the latter is made of wood and is equipped with a winch with which to adjust the elevator



Canadian Ingersoll-Rand Portable Crushing Outfit.

to the discharge opening of the crusher, after which the foot of the frame may be easily blocked up. A steel-bucket, chain-type elevator, fitted with adjustable take-up boxes is used and is driven by a belt from one of the crusher flywheels.

A four-compartment, 20 ton, inverted V bottom-bin, with adjustable self-closing chutes, on both sides, and weighing about 5500 pounds is generally supplied with these outfits. These bins are lined with steel plate, and the frame rests on a steel truck, carried on four iron wheels. Bolted posts are fitted to each corner of this steel truck-frame so that it may be blocked-up to relieve the wheels and axles of all strain when the bin is full. A box mounted on the truck frame provides a convenient place for the storage of tools, jacks, etc. Screens used with this equipment are generally of the rotary type, with three sizes of perforations, and are driven by a sprocket and chain connected to the elevator head-shaft.

These portable crushing-outfits are built in two sizes, the smallest of which has a capacity of 7½ to 15 tons, depending on the size of crushed rock desired, requires 15 H.P. and weighs complete with folding elevator, 10800 pounds, while the larger size weighs 12500 pounds, has a capacity of 8½ to 20 tons, and requires 20 H.P. An electric motor, a gasoline engine, or a plain slide-valve engine, mounted on a wheeled locomotive-type boiler, are suitable sources of power for the operation of these outfits, and although the latter is perhaps more reliable and is far more commonly used for the purpose, a gasoline engine has the advantage of decreasing the bulk and weight of the complete equipment and increases the portability to some extent. Where electric power is available, the location of the plant can be frequently changed with little or no trouble.

THE BURREL MASK FOR CARBON MONOXIDE.

It was generally understood that during the war the scientific investigators of the allies tried in vain to perfect a gas-mask which would eliminate carbon-monoxide from the atmosphere. Materials were found which would satisfactorily protect men against the presence of such gases as bromine, chlorine and phosgene in the surrounding atmosphere, but carbon-monoxide is a gas that it was found not only difficult to provide protection against, but even to detect in time to prevent fatal results. In making this statement it is necessary to distinguish clearly between the uses of the gas-mask and the self-contained oxygen breathing apparatus. One is merely a filter, designed to eliminate poisonous gases from the air of respiration, while the other is a device by which the wearer is rendered independent of the outer atmosphere, and carries his own breathing-air with him. Some unfortunate results have followed a confusion of the uses of these two distinct devices.

It is therefore of much interest to miners to know that a gas-mask is now on the market which it is claimed will protect the wearer against carbon-monoxide gas. This device is known as the "Burrell Gas Mask for Carbon-Monoixde," and is supplied by the Mines Safety Appliance Company of Pittsburg, Pa.

The absorbent material has been given the name of "Hopcalite," being, it is stated, a combination of substances which it is stated will at ordinary temperatures act catalytically and convert carbon-monoxide into carbon dioxide. The mask consists of a face-piece, exhalation valve, connecting tube, canister, harness and case, weighing in all three and a half pounds.

The Mines Safety Appliance Co. also offer a carbon-monoxide indicator, likewise stated to be a war-time development. The indicating fluid is contained in a glass tube, the contents of which assume a lighter or a deeper green tint according to the concentration of carbon-monoxide present, and by means of a colour scale, the approximate percentage of carbon-monoxide can be ascertained. We do not remember to have heard previously either of a mask that would give protection against monoxide, or of a workable indicator of the presence of this insidious and deadly gas, and if the two devices now being offered for sale by the Mines Safety Appliances Co. will do what is claimed for them, then a notable advance has been made in the fight against the dangers of the mine.

It is well known that the greater percentage of those who are the victims of coal mine explosions die, not from the blast itself, but from the carbon-monoxide which speedily pervades the mine air following the blast, arising from the effect of intense heat and the burning of carbonaceous materials in a supply of oxygen insufficient to complete the process of combustion to the point of forming carbon-dioxide.

In one instance, taken from the writer's own experience, the percentage of carbon-monoxide victims was not less than seventy-five of the total of those killed in a mine explosion, and there was indubitable proof that those who had died from monoxide had been exposed to its effects for not more than twenty minutes or half an hour, and were also at all times within a few minutes' distance of fresh air. In this particular explosion, when the dead men were reached, their lamps were still burning, as monoxide does not affect a flame except to slightly increase its brilliance. Had these men possessed some means of passing through the monoxide zone, only a short one, and also only a temporary one, they could have reached safety. The problem of mine rescue work following an explosion has usually presented itself to those on the surface as to how to get into the workings, so as to reach the men in the mine, but to these men the problem is, how can we get out? Often they are quite uninjured, and quite capable of helping themselves if only they can escape the carbon-monoxide.

There is also another phase which a satisfactory carbon-monoxide mask develops, namely, the use of self-contained breathing apparatus. In many cases the mine air is not entirely fouled, that is to the extinction of the percentage of oxygen necessary to support life; but it is rather poisoned, and under such circumstances the use of a carbon-monoxide mask suggests itself, and opens up many possibilities.

The idea of the "Pneumatogen," the only really lightweight self-contained breathing device that was ever put on the market, proceeded more than a desire to invent a self-rescue apparatus, that a man could take in the mine with him and keep by him for the emergency; than it did from a desire to compass the functions of the standard type of oxygen breathing- apparatus as they are now understood. It was always the writer's opinion that in the "Pneumatogen" lay the germ of the mine-rescue apparatus of the future, and the fact that the "Pneumatogen" was a German device has no bearing whatever on the points that are of importance. The combination of the know capabilities of the self-contained oxygen breathing-apparatus with the novel possibilities held out by a carbon-monoxide mask

and detector, contain much promise for the future, which there is no doubt the large body of men who are now thoroughly acquainted with the work of mine rescue and the fighting of underground fires can be trusted to develop to the great future advantage of the mining industry.—F. W. G.

MOLYBDENUM STEEL.

A cable report from England tells of the reported perfection of a molybdenum high-speed steel by Prof. John Oliver Arnold, who has for many years been at the head of the Department of Metallurgy in the University of Sheffield, and has recently retired from that position. The cabled report is taken from the "Daily Mail," not an entirely reliable organ, particularly where any regulation of the British Government is concerned, which intimates that Britain is likely to lose the benefit of Prof. Arnold's formula because under the Defense of the Realm Act it is not permitted to him to utilize the formula commercially in Britain. The cable states that Prof. Arnold will be allowed to proceed with the taking out of an American patent, "on condition that he publishes nothing concerning it." How a patent can be taken out under these conditions is not explained, and altogether the cabled account is—to put it mildly—incoherent.

The interest to Canada is supposed to consist in the large new field for molydenum that will be opened up. The following extract from the Report of the Department of Mines of Quebec for 1918 sums up most of what is at present known regarding the uses of molybdenum:

"The chief use of molybdenite is in the manufacture of ferro-molybdenum, which enters into the composition of high-speed tool steels, molybdenum tool steel possessing the same qualities as tungsten steel. The main objection to substituting molybdenum for tungsten in the manufacture of self-hardening tool steel is that to give satisfactory results, great care and skill are required in observing the proper proportions and in the annealing process. It requires about three times less molybdenum than tungsten to obtain the same effects in the tool steel, but molybdenum steel is much more liable to crack, or otherwise deteriorate in careless quenching.

Molybdenite is also used in the manufacture of chemicals, ammonium molydate, sodium molybdate, and molybdic acid.

Apart from these uses the technology of molybdenum is more or less obscure. A short time before the declaration of war, prices for molybdenite rose steadily until in 1914 it attained $3.00 and $4.00 a lb. It is surmised that this rise was due to German buyers securing stocks as a substitute for tungsten. Other uses to which molybdenum and molybdenum compounds are said to have been put to a great extent, but most of which have been alternately denied and reiterated, are manufacture of smokeless powder, stabilizers for high explosives, to prevent their decomposition and spontaneous explosion; special steels for gun linings and for rifle barrels; armour plates and manufacture of plate-piercing projectiles. Enquiries made by the United States Geological Survey from the military authorities of the Allies brought forth the fact that none of the war material manufacturers of the United States, France or England were using molybdenum in armour plates or large guns, and that numerous analysis of captured German guns showed that it was not being used by the Germans.

The French, however, used molybdenum in the manufacture of the breech blocks of some of their field guns. The alloy "stellite" may also contain a small proportion of molybdenum. The original "stellite" is an alloy of cobalt 50 to 60 per cent, chromium 30 to 40 per cent, tungsten 8 to 20 per cent. Sometimes part of the tungsten is replaced by molybdenum. A small proportion of molybdenum, less than one per cent, has also been used in the steel of some of the crank shafts and connecting rods of the "Liberty" motors for aircrafts, built for the United States War Department."

So far as can be gathered from the very little that has been published regarding molybdenum steels, the quantity of this alloy material used has hitherto been very small. Molybdenum ore is quoted nominally in New York at 75 cents per pound at the present time. Molybdenum steels are being advertised rather extensively in trade papers in the United States at the present time. It is open to anyone to experiment in alloy steels, and it is difficult to see how a formula can be patented unless it includes something new in metallurgical science. No doubt Professor Arnold will announce the results of his research work in due time, as so many important discoveries have been previously announced from the Department of Metallurgy at Sheffield University, or, as old students remember it better, the Technical School in St. George's Square. Andrews, Sorby, Hadfield, Arnold, are names that are associated with radical advances in metallurgy, and with the study of that science in Sheffield schools, and the tradotions of these schools do not tend to incline one to the belief that there can be any tendency to withhold from national benefit anything that is really important. Really some of the news that is cabled from London for Canadian consumption is almost infantile. Three examples within a week include the reported transmutation of metals by Prof. Rutherford, the "scrapping" of the new plant of the Dominion Steel Corporation, and lastly, this wierd yarn about molybdenum steel.—F.W.G.

NEW METHOD OF UTILIZING LIGNITE.

A new method of utilizing the vast deposits of low grade lignite coal, commonly known as Souris coal, which underlie great tracts of the southwestern and south-central portions of the province of Manitoba, has been successfully demonstrated by the provincial government in the power plant of the town of Souris. This plant, formerly operated on American anthracite, was remodeled by the gas engineer of the Public Utilities Commission in 1916, the new arrangement being the first of its kind on the continent. It has operated four years without hitch, showing a reduction of 40 per cent, in fuel cost, a considerable increase in efficiency, and the requirement of less labor and attention. The experiment was financed by the provincial government, but the whole cost has been absorbed by the town after demonstration that the plant was a permanent success. Coupled with the successful experiments of the Lignite Utilization Board in the briquetting of lignite coal, this gives bright promise that the enormous deposits of lignite coal, both in Manitoba and Saskatchewan, can be used to advantage, in the direction of replacement, as compared with the price of imported American coal.—C. P. R. Monthly Bull.

The Dominion Iron and Steel Company's Koppers By-Product Coke Plant at Sydney, N.S.

By C. E. Wallin, Superintendent of Coke Oven Dept.

During 1916 it became evident that the coke plant of the Dominion Iron & Steel Co. at Sydney, would be taxed to its utmost to provide sufficient coke for the Blast Furnaces then in operation, and furthermore the small size of the ovens on the plant first erected and the method of handling the coke after quenching would always militate against the production of coke at a cost which would compare favorably with coke made in more modern plants.

The importance and necessity from an economic standpoint of recovering the greatest possible percentage of by-products has been so often emphasised, notably in recent articles in this journal by Messrs. Marquard and Lucas, that there is no occasion to touch further on this phase of the subject.

To obtain a plant embodying the latest improvements in by-product operation and labour saving machinery, a contract was placed with H. Kopper's Co. of Pittsburg for the erection of two batteries of 60 ovens each, and work was commenced on the site by the By-Product Coke Company of Canada Ltd, in the spring of 1917. Construction was delayed owing to difficulty in obtaining delivery of materials but, even so, the first battery was put in operation on Oct. 12th, 1918 and the second on March 27th of the present year.

The Coal carbonized is 100% high volatile slack coal from the Dominion Coal Coy's mines and has in the raw state the following average analysis.

	Per Cent.
Volatile Matter	33.50
Fixed Carbon	57.50
Ash	9.00
Sulphur	2.50

Before being delivered to the ovens the coal is first crushed in a Jeffries roll crusher and then passed through a British Baum Washer, of 150 long tons per hour capacity, to lower the ash and sulphur contents. On its passage to the crusher the coal is screened to eliminate the fines which by-pass the crusher and mix with the crushed coal at the foot of the elevator.

The coal leaving the washer has a moisture content of approximately 11% and the following analysis calculated on a dry basis:

	Per Cent.
Volatile Matter	34.50
Fixed Carbon	60.50
Ash	5.00
Sulphur	1.60

The washed coal is delivered on to a 36″ belt conveyor and delivered to the oven bin which has a capacity of 2200 net tons of coal and is situated above and midway between both batteries.

The ovens are of the standard Koppers regenerative type and of the following dimensions.

Length between door brick	37′ 6″
Width on pusher side	15¾″
Width on Coke side	18¼″
Height from floor to top of coal	8′ 7″

and have a capacity of 11.3 tons of coal weighing 49 lbs. to the cubic foot, but the density of the coal varies somewhat owing to varying moisture content of the washed coal and percentage of fines in the slack supplied.

The batteries consist of sixty ovens each, Fig 1. each oven having independent regenerators, thus constituting a separate unit. Heating is effected by the combustion of a part of the gas generated during carbonisation, the gas being supplied alternately to the pusher and coke sides of the ovens. The gas is supplied to the 16 vertical flues on the pusher side and 14 on the coke side by means of a hollow gun brick running the entire length of the oven and having outlets on top. These outlets are fitted with nozzle brick with an elliptical orifice at which point combustion of the gas takes place. The size of this orifice varies with the position of the nozzle brick along the gun brick, the size increasing from the second nozzle on either side to the division wall of the battery to make allowance for the drop in pressure and increase in temperature of the gas during its passage through the gun brick. The largest nozzle is in the outside flue on each side on account of the large amount of heat lost through radiation at the doors. The volume of gas supplied to each battery for heating purposes is measured by 16″ x 8″ indicating and recording Venturi meters.

The necessary air for combustion is drawn, by the stack draft, through the regenerator on the side on which the gas is burning; and in doing so becomes heated to approximately 1800°F. From the regenerator it passes into the vertical flues alongside the gas nozzles. The amount of air admitted to each individual regenerator is regulated by dampers on the air box, the damper for the oven furthest away from the stack having naturally the widest opening. This makes it possible to equalise the draft conditions on each oven. A further adjustment can be obtained by altering the size of the opening, where the vertical flue joins the horizontal flue, by means of a sliding brick.

Each vertical flue can be inspected from the top of the battery by the removal of a cast iron cap and it is possible in this way to take the temperatures of the flues, examine the state of the nozzle brick and change the same if necessary, make adjustment of the sliding brick settings and generally keep a close check on the conditions under which the combustion of the gas is taking place.

The advantages to be gained from this system of oven heating are the close adjustments of gas and air with the result that the oven walls are evenly heated by the minimum amount of fuel gas. The gas is reversed every half hour, or twenty minutes in cases where extremely high flue temperatures are carried.

All the operations of reversal are carried out by means of a master control which shuts off the gas on one side, reverses the stack dampers and air openings and finally open the gas cocks on the opposite side. This control is put into operation by means of a self-winding clock which makes certain electrical connections every half hour or twenty minutes as the case may be.

The products of combustion are carried away by side flues running the length of the battery to a stack 7' 6'' in diameter and 200 feet high.

The coal is charged into the ovens from a larry equipped with four hoppers and a sufficient quantity of coal is drawn from the oven bin into these hoppers to fill the oven to the proper level. This level is regulated so as to allow contact of the gas with the heated brickwork for as short a time as possible.

After the coal is discharged from the larry into the oven, it is levelled off, the charging covers placed in position and luted down and the oven connected to the collecting main by opening a butterfly valve. Under these conditions a charge of coal can be carbonised in 18 hours, with an average flue temperature of 2470°F. The ovens are designed for a coking period of 15½-16½ hours but with a washed coal containing 11% moisture it is not deemed advisable to raise the flue temperature to the height necessary to accomplish this.

At the end of the coking period the oven is cut off the main, the doors removed by door machines on either side of the battery, and the charge of coke is pushed out into a wide dumping car of steel and cast iron construction. The car is then brought by an electric locomotive to the quenching station where the coke is subjected to a spray of water for 35—40 seconds. After draining in the car for five minutes it is discharged on to the coke wharf, the power for elevating the dumping doors being provided by an air compressor on the electric locomotive. The coke contains on an average 1.5% moisture. Figs 2, 3 and 4.

From the wharf the coke is fed into a belt conveyor which delivers it on to a ¾'' bar grizzley screen, the furnace coke and breeze being delivered direct into cars down their respective chutes. Fig 5.

The collecting main on the ovens is connected by two crossover mains to the suction main from the batteries. It is important to carry as constant a pressure as possible on the collecting main and to ensure this each crossover is fitted with a governing device known as a North Western governor. A float controlled by the gas pressure in the collecting main is set to give in the neutral position the desired pressure and any variation in the position of the float caused by a rise or fall in presure actuates a lever making electrical contact in the power circuit of a small reversing motor. The motor in turn opens or closes a butterfly valve allowing more or less gas to pass from the collecting main until the lever attains the neutral position and breaks the contact. Only one governor on each battery is in operation, the other acting as a spare.

The suction mains from both batteries unite in a common downcomer outside the by-product building.

In order to keep all mains clear of pitch which, if not removed, would eventually block the mains, a flush of hot tar and gas liquor is kept in circulation by

Fig. 3—Locomotive and Coke Quenching Car, showing a charge of coke being pushed out of the oven-chamber.

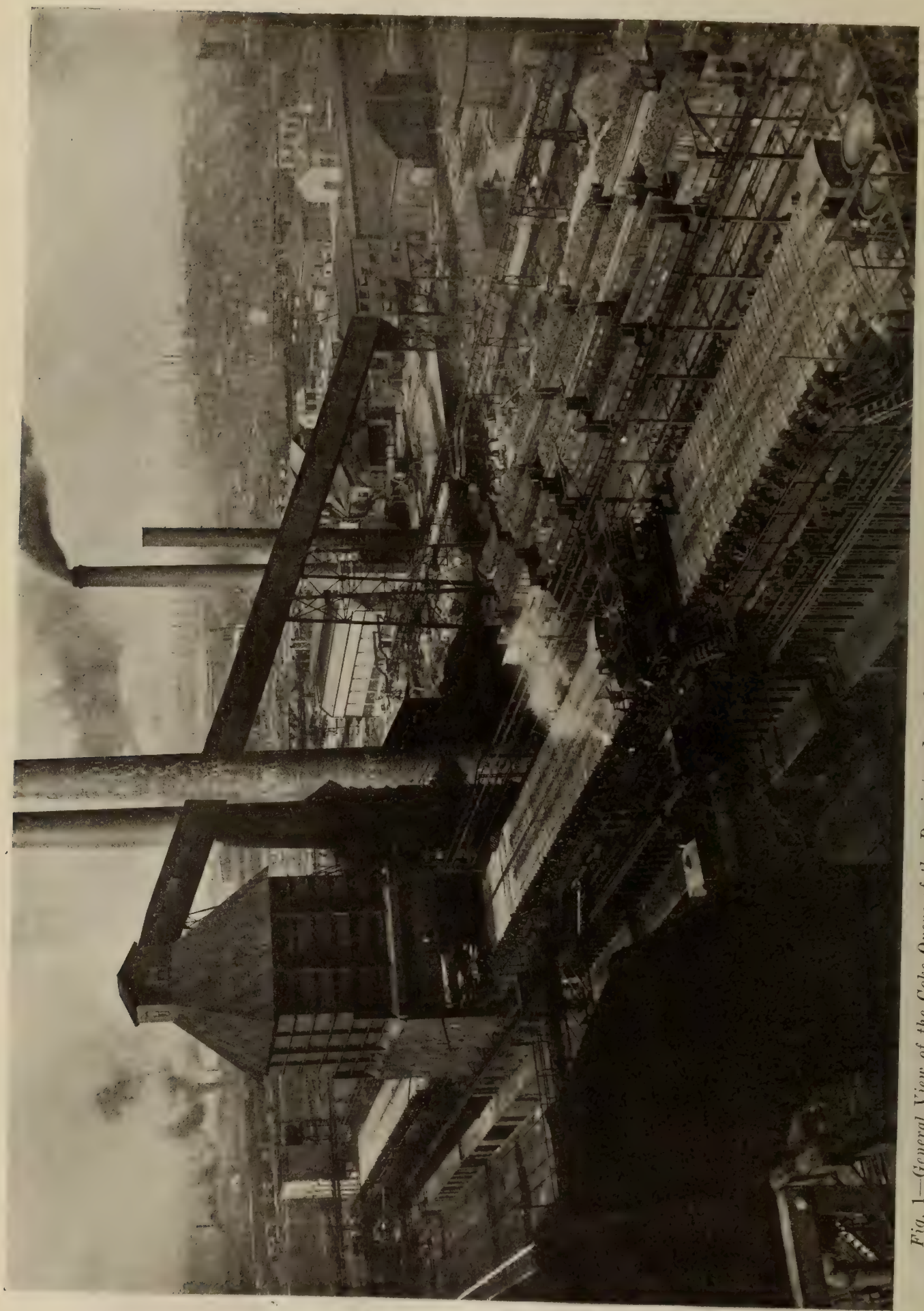


Fig. 1—General View of the Coke Ovens of the Dominion Iron & Steel Company at Sydney, Nova Scotia, showing in foreground the Koppers Ovens. Coal Pocket, Larry and Coke Sidings; and, in the distance, Sydney Harbor.

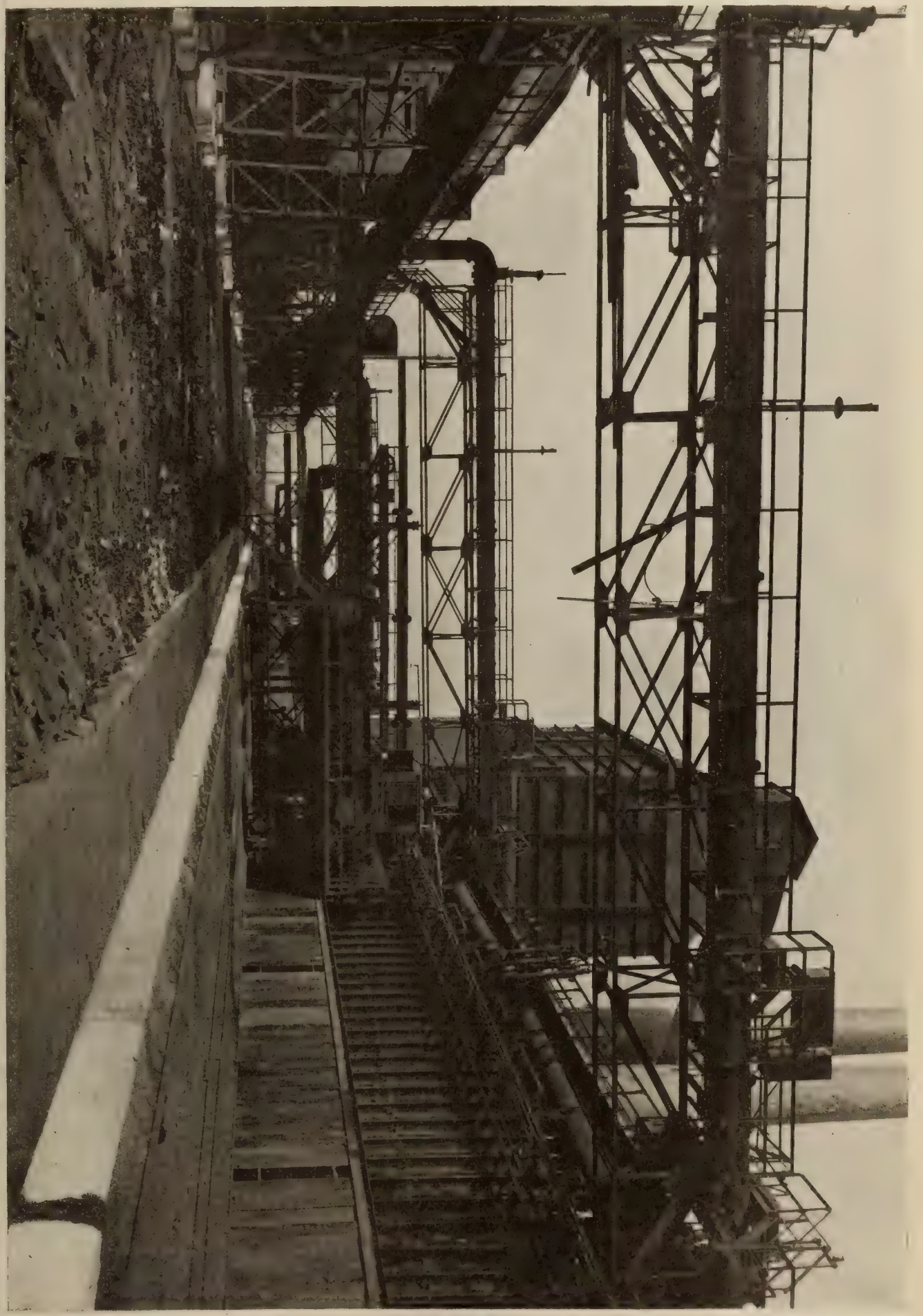


Fig. 2—Pusher Side of Ovens, showing Pusher and Pusher Track, and the Cross-over and Suction Pipe Mains.

means of a centrifugal pump, the solid matter being filtered off by suitable screens.

The gas entering the by-product building is first cooled by passing through a multitubular cooler, gas and water entering at opposite ends; the gas passing around the tubes and the water through them.

The gas temperature at the exit of the coolers is determined and kept constant by the automatic Tagliabue temperature control operating, by means of compressed air, a motor valve on the inlet water line By this means the gas is cooled down to 28°C at which temperature most of the lighter tar and water vapour is deposited and carried away to the hot drain tank to be used as a flush in the mains as mentioned above.

The gas is drawn away from the ovens by a Root's exhauster with a capacity of 700,000 cu. ft. per hour and capable of exerting a pressure of 3½ lbs., the exhauster is driven by a 20½" x 24" Fleming Engine operating at a pressure of 100 lbs, per sq. in. The engine is equipped with piston valves, the cut off being regulated by a Root's gas governor which keeps a constant suction on the main by varying the speed of the engine to deal with varying volumes of gas. In passing through the exhauster the gas is heated up to 35°C and is then led through a Tar extractor where the last traces of tar are eliminated and flow to the hot drain tank with the tar from the primary coolers. Fig. 6

The gas is next passed through a tubular reheater. and its temperature raised to 60°C by the exhaust steam from the engines, and then to the Saurator which is a cylindrical cast iron vessel lined with lead. The hot gas is carried down a vertical lead pipe inside the saturator, into a horizontal cracker pipe also of lead. The cracker pipe is of inverted U section and is slotted with vertical semi-elliptical holes through which the gas passes.

The Saturator contains a solution of Ammonia Sulphate with 7% free Sulphuric Acid and the ammonia in the gas, in passing through this bath, combines with the Sulphuric Acid forming Ammonia Sulphate, which crystallises out and is continually ejected by a compressed air syphon on to the drain table, the mother liquor flowing back again to the saturator. A continuous addition of Sulphuric Acid is made to the saturator, the amount being run in being determined by the operator who tests the free acid content of the bath at intervals of half an hour. Fig. 7.

The sulphate from the drain table is flushed in to a centrifugal dryer where it is washed with hot water and finally whizzed for ten minutes at 600 revolutions per minute. The finished sulphate averages .2% free acid and 1.5—2.% moisture and is a good white colour.

The By-Product house is equipped with three complete interchangeable sets of engines and exhausters, tar extractors, reheaters and saturators, each being capable of dealing with gas from 60 ovens, so that there is always one spare set available in case of breakdown.

Fig. 4—Quenching a charge of coke. Coke-wharf on the right.

The ammonia condensed from the gas as gas liquor, contains 50 per cent of the total ammonia and after running in to the hot drain tank with the tar, is pumped into a settling tank where the liquor settles on the top of the tar and liquor and tar are then run off into separate storage tanks. The tar thus obtained contains 2 per cent moisture.

The gas liquor is fed into a 6′ 0″ ammonia still having free and fixed stills on separate foundations, the lime necessary to decompose the ammonia salts is introduced into the bottom section of the free still, and steam for the operation is furnished by the exhaust steam from the engines at 15 pounds pressure. The flow of liquor is measured by means of a Venturi meter, 3,000 gallons per hour has been successfully treated with a loss of .015 grams per litre of ammonia in the waste liquor.

The gas liquor contains 8.2 grams per litre of total ammonia of which 75 per cent is in the fixed state.

The ammonia vapour generated is led through a covered pipe which is connected to the main gas line between reheater and saturator.

The top temperature of the still is kept constant at 99° except for 1 hour at the end of each shift when it is raised to 103°C, and at the same time the acid content of the saturator is increased. This prevents the cracker pipe and saturator becoming salted up and blocking the passage of the gas.

After leaving the saturator the pas passes through an acid separator where the traces of acid mother liquor carried by the gas are deposited, and thence to the final cooler. The cooler consists of a steel tower 60′ 0″ high and 12′ 0″ in diameter containing sets of wooden grids. The gas in its upward passage meets a descending spray of water, the cooling being accompanied by a partial deposition of naphthalene. The temperature of the gas is here reduced from 60°C to approximately 20°C., the latter temperature depending on the temperature of the cooling water, but no difficulty has been experienced in cooling the gas, if necessary, to within three degrees of the temperature of the water as shown at the inlet to the cooler.

After being cooled the gas passes through two towers of similar design to the final cooler, but 100′ 0″ high and 15′ 0″ in diameter. Here it is washed with a high boiling point petroleum oil which absorbs the Benzol vapours from the gas, 95 per cent of the total Benzol being absorbed with suitable conditions of gas and oil temperatures and oil flow.

The debenzolized gas is then passed to a holder of 40,000 cu. ft. capacity. From the holder it is delivered to the fuel mains at the batteries and the surplus gas is measured by an indicating and recording it is sent under pressure to the steel plant. The surplus gas is measured by an indicating and recording Venturi meter. Should it be necesary, at any time, to cut off the supply of surplus gas at the steel plant, the holder, when full, automatically opens a valve on

Fig. 5—Loading Coke and Breeze Simultaneously.

the bleeder line and discharges the surplus gas into the atmosphere.

The gas has the following average analysis:—

	Per cent.
Carbon dioxide	2.0
Illuminants	3.5
Oxygen	.5
Carbon Monoxide	7.0
Methane	31.5
Hydrogen	48.5
Nitrogen	7.0

The Benzolised oil is pumped to the Benzol Plant and there stripped of the Benzol and its homologues and the cooled debenzolized oil returned to be again circulated through the towers.

No description of the Benzol Plant is given as it does not form part of the Kopper's installation, but it may be stated that Benzol, Toloul, Xylol, and Solvent Naphtha of the highest degree of purity have been produced in large quantities, notably during the period of the war.

Below are given some operating statistics which may be of some interest.

	m.m. water
Suction after primary coolers	175
" before " "	85
Pressure on collecting mains	3.5
Stack draft	21.0
Gas Consumed—	cu. ft.
On ovens per hr. Pusher side	180,000
On ovens per hr. Coke side	170,000
Percentage of total gas	40%

Production (Short tons.)

	Per ton dry coal	Per 24 hrs.
Furnace Coke (lbs.)	1360	1180*
Surplus Gas (cu. ft.)	6300	10,987,000
Tar (Imp. Gal.)	11.0	19,000
Ammonium Sulphate (lbs.)	28.0	24.4*
Ammonium Sulphate loss in Saturators and Stills (lbs.)	.086	150
Light oil (Imp. Gal.)	2.9	4800
Coal charged per oven		11.0*

* Tons.

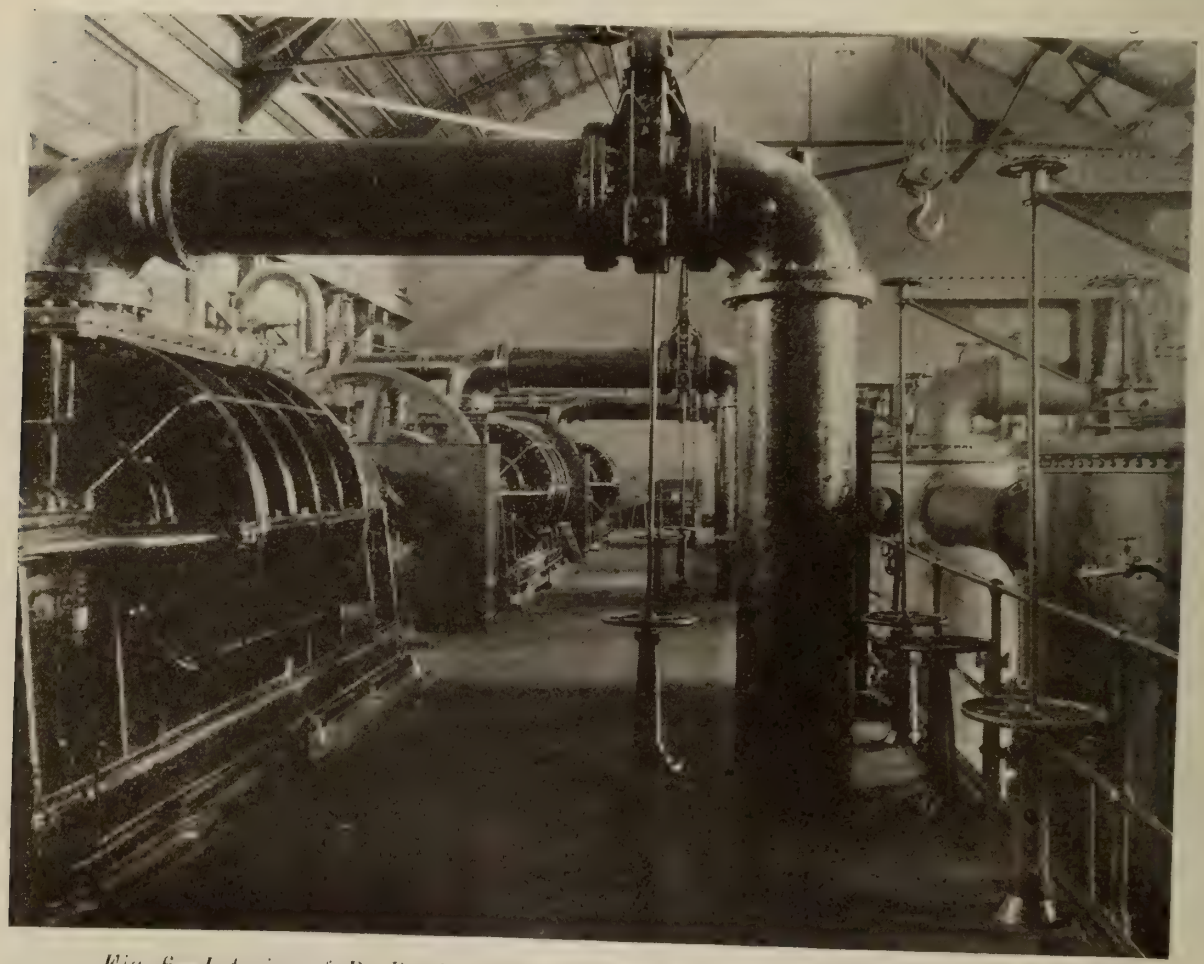


Fig. 6—Interior of By-Product House, showing Engines and Gas Exhausters.

Our Northern Ontario Letter

During the past week the quotations for silver having sagged to around $1.30, rose sharply again to $1.34 an ounce at the time of writing. This is New York quotation, and is equal to around $1.45 in Canada, at prevailing high rate of exchange. Some of the leading silver producers of Cobalt can now look back to 1915, at which time they sold silver at around 46 and 47 cents an ounce, or just $1 under present quotations. At this rate the average net profit amounts to approximately 90 cents an ounce and constitutes a volume of net revenue equal to any previous period in the camp''s history.

Recent rich finds at the Crown Reserve, Beaver Consolidated, Temiskaming, as well as the rich vein opened up some months ago on the Nipissing promises to offset the natural decline in output from other sources to the end that the 1920 production may reasonably exceed that of the current year.

At the 150-ft. level of the Crown Reserve a substantial quantity of high grade ore has already been opened up as a result of the development of the new vein which was reported in these columns. Picked samples contain upwards of fifty per cent silver and a considerable amount has been bagged which runs several thousand ounces to the ton. It is learned that the company will establish a record output for December as compared with any previous month in recent years. Although not sufficient work has been done to determine the lasting importance of the new find, yet it has every appearance of being likely to continue for some distance.

The McKinley-Darragh continues to operate its flotation plant, which together with the operations underground is resulting in an average output about on a par with that of 1918. The 1918 output amounted to 904,543 ounces, and the fact that the 1919 output will about equal the preceding year in spite of the 46-day labor strike this year speaks volumes for the physical condition of the McKinley. Total production from this mine since 1906 amounts to a little over 19,000,000 ounces.

The Temiskaming Mining Company's declaration of a dividend of 4 per cent payable in January is an indication of the prosperity of that old property. The favorable developments, which date from April last, are believed to be the direct cause of the dividend being paid. The disbursement, however, is believed to be an interim one in that it is somewhat higher than the former rate and is considered too high to become a regular rate of dividend.

Producing at around $12,000 daily, and with a surplus of $4,300,000 the Nipissing Mining Company has declared a dividend of 5 per cent plus a bonus of 5 per cent, the disbursement amounting to $600,000. Although officials are reticent regarding ore reserves, yet it is reported in usually well informed circles that the ore reserves at the end of 1919 promise to have a value around $10,000,000, made up of something like 7,000,000 ounces of silver.

In a report covering the period from July 15th to December 2nd the directors of the Peterson Lake announce that the company has a surplus of current assets over liabilities of $13,094.76, as compared with almost nil one year ago. It is stated that a recent shipment of ore netted the company $13,727. It is stated that 385,000 shares of treasury stock were sold at 15 cents a share, the stock to be paid for in monthly installments. With this money, profits expected from the ore on hand and with $24,000 in the bank, the company expects that upwards of $90,000 will be avaiable for development work. This does not include the potential value of the tailings pile which the courts recently decided belong to the Peterson Lake Company.

The tailings dump on the Chambers-Ferland property has been optioned to H. Cecil and his associates for an ultimate price of between $50,000 and $100,000. Plans are being made to sample the material.

At the Adanac property one diamond drill machine continues to operate from a cross-cut at the 310-ft. level. No developments of particular interest have so far occurred.

Alfred R. Whitman, mining geologist, has been engaged to make a geological survey of the Genesee property, and commenced work late last week. The Genesee has been opened up to a depth of 500 feet, at which level considerable faulting occurred, and close to which faults, low but encouraging silver values were encountered.

The Cobalt 53 Silver Mining Company has been incorporated for the purpose of developing that piece of ground in Gillies Limit known as block 53 and on which some encouraging veins occur at surface.

The litigation in connection with the Bailey-Cobalt and the question of merging with the Northern Customs Company is still unsettled, the case having recently been heard before Justice Sutherland at Osgoode Hall, Toronto, the previous order of the assistant Master in Ordinary being refused. An appeal has been made to Mr. Justice Lennox for permission to take the case into the Divisional Court. Decision on this matter is reserved.

Regarding the recently reported negotiations between the Northern Customs Company and the La Rose, Mr. Young, President of the former company, states that no recent offer has been made.

Following is a statement of ore shipments over the T. & N. O. Ry. for the month ending November 30th, 1919. (In tons of 2,000 lbs.):

Silver Ore

Cobalt Proper	Tons
Buffalo	302.30
Coniagas	96.08
Dominion Reduction	3.00
Hudson Bay	31.60
La Rose	41.74
McKinley-Darragh	94.97
Mining Corporation	143.54
O'Brien	64.93
Trethewey	62.98
	869.14

The above shipments were made to the following Companies:

Canada		
Deloro Smelting & Refining Co.	Marmora	281.21
Coniagas Reduction Co.	Thorold	126.08
United States		
American Smelting & Refining Co	Pueblo	311.88
American Smelting & Refining Co.	Perth Amboy	55.00
Pennsylvania Smelting Co.	Carnegie	94.97
		869.14

The Gold Mines

The opinion is being freely expressed in Northern Ontario that the Dominion Government should make a special effort to induce mine operators in this country to produce more gold. It is significant to note that without any governmental assistance and confronted with an economic situation which is causing a rapid decline in output in such countries as the United States, the mine operators of this province during the last quarter of 1919 succeeded in establishing the highest record in Ontario's history. With such aggressiveness on the part of the operators, and with the physical condition of the mines commanding unbounded optimism, the situation presents a genuine opportunity for the Government to take steps to make gold mining more attractive. Stereotyped phrases such as "something should be done" are meaningless. The fact is that the gold deposits are here and gold is concentrated in values which enable operators to realize a fair profit, but that the desired number of men are not available to work the mines at capacity, and the Government does not appear to have considered it worth while to devise some scheme whereby the men could be procured.

On December 31st the Hollinger Consolidated will disburse $246,000 in dividends. On January 15th the Dome Mines will make a $100,000 disbursement. Concerning both of the two mines mention, the year 1920 appears to offer reasons for believing that new high records in point of gross production as well as net profit will be realized.

Tonnage being treated at the McIntyre is somewhat above the average for the past fiscal year, and net earnings for the current year are expected to amount to at least 20 per cent. Developments at depths continue favorable.

The mill at the Dome Lake is to be tried out this week, and the management entertains hope of being able to establish a fairly uniform rate of production. In connection with transportation to the outlying mining camps, the suggestion is being made this week by a prominent mining engineer that a "loopline" (meter gage) could be built to great advantage, commencing at Boston Creek Station, passing through the Boston Creekarea eastward through Catherine Township, through the northwest part of Skead and running north to Larder Lake. Thence turning west so as to pass through McVittie Township by way of the Argonaut mine (formerly La Mine Dor Huronia) and westward through Gauthier and Lebel to Kirkland Lake to terminate at Swastika. Such a line would be about fifty miles in length. It is suggested that the holders of mining property along the way might become bondholders in the enterprise because it would be to their mutual benefit as an accommodation and a means of more rapid development, besides assuring a saving of enormous transportation expenses.

Reports brought out from Skead township, as well as the Township of Hearst, are encouraging and indicate considerable activity. This week a new find was made in Hearst Township, close to the north boundary of Skead.

Kirkland Lake and Boston Creek districts continue active with reasonable promise of added activity with the passing of winter.

Special Correspondence

BRITISH COLUMBIA

The Collieries

John Newton, for many years District Mines Inspector with headquarters at Nanaimo, B.C., died on the 6th of December. Although ill for months he continued his official duties up to within a few days of the end, having been on a trip of inspection of the Britannia Mines, Howe Sound, when overcome. His death occurred shortly after he returned to his home city. Mr. Newton's work was almost entirely among the coal mines of Nanaimo District and he was well-known to officials and men of the Canadian Western Fuel Company and the Canadian Collieries (D) Ltd., and highly respected by all.

The position thus vacant will be filled by Henry Devlin, a long service member of the Mines' Inspection Staff, who for years has shared with the late Mr. Newton the responsibilities of the Nanaimo Inspectorate. He has had jurisdiction over the Comox and Extension Coal Mines.

Pending another appointment Mr. Devlin's place is being taken by James Dixon, a member of the Board of Examiners, and who, under the terms of a recent amendment to the Coal Mines Regulation Act, also is an Acting Inspector.

The Editor desires to add a word of personal regret upon hearing of the death of Mr. Newton. He had the pleasure of travelling with Mr. Newton from Nanaimo on the 1st of December, on the return of the party of Canadian Mining Institute members which had visited the Island collieries over the week-end, and learnt from Mr. Newton a great deal of the early history and development of the Nanaimo coalfield. Mr. Newton was quite apparently suffering from a heavy cold, and was really not fit to undertake the journey to Britannia. Mr. Newton was born near Whitehaven, Cumberland County, England, and was one of a number of men from that district who made a home in Vancouver Island, and achieved positions of responsibility through hard work and personal merit. In the course of a first and brief acquaintance, Mr. Newton impressed one as being a man of much worth, and his death, practically in harness, confirms an opinion formed upon short acquaintance, which, unfortunately, it will not now be possible to renew.

It is reported from London, England, that a re-organization of the Canadian Collieries (D) Ltd., operating collieries on Vancouver Island, British Columbia, has been decided upon and that as a result, the property will be handed over to the bond-holders; or, rather, that the changes contemplated virtually will have such an effect. On January 19th a meeting will be held to authorize the plan.

In this connection the London Times observes:

"To what extent the Company will be able to pay interest on debentures will depend upon the ability to sell the coal it can produce. The Company has coal, but the difficulty is to sell it in sufficient quantities, but trade on the Pacific no doubt will expand."

No statement has been given out by the Company's local management, whose headquarters are in Victoria.

The Canadian Collieries (D) Ltd., has extensive holdings on Vancouver Island. It has producing mines at

Comox, Extension, and South Wellington and coal rights throughout a large section of what is known as the Esquimalt and Nanaimo Railway Belt.

Officials of the One Big Union are beginning to show signs of activity again among the coal miners of the Fernie (Crow's Nest Pass(District. On December 9th a mass meeting was held at which H. Beard, president of the O.B.U., spoke. The result, according to report, is that a vote was taken as to whether the miners would stand by the O.B.U. or continue in their allegiance to the United Mine Workers of America. No official announcement of the way the vote went is obtainable. If it favored going back to the O.B.U., as seems to be the impression, it is hard to predict the outcome as the men withdrew from that organization and decided to stay with the U.M.W. of A. when the strike of the early part of this year ended. That strike lasted three months and was caused by the determination of the management of the Crow's Nest Pass Coal Company not to negotiate with the One Big Union.

Coal and its by-products was the subject of a paper by Alexander Sharp, C.E., read recently at one of a series of winter lectures being held under the auspices of the British Columbia Chamber of Mines. After speaking of the waste involved in the use of coal direct from the mine he observed that the principles of carbonizing coal should be adopted to supply cheap fuel for manufacturing and domestic purposes, then the Provincial iron ores could be melted with a coke sold at $5 a ton.

The coal returns for the month of October indicate that operators of collieries are responding to the increased demand for fuel for domestic purposes and to meet the market in the adjoining sections of the United States, which has been strengthened through the recent strike in the bituminous mines of America. In the Crow's Nest Field the Crow's Nest Pass Coal Company is back to normal in respect of its production for the first time since the month of August when the three month strike was settled. In the month of August it produced 5,344 tons of coal while in October the output had mounted to 41,284 tons. The latter figures refer only to the Coal Creek Mines. If the Michel Mines are included the October production aggregated 63,431 tons. On Vancouver Island the same condition is shown, although the increase is not so marked for the reason that there have been no labor troubles in this section. Notwithstanding, the increased demand has brought the output of the Canadian Western Fuel Co. from 49,000 odd tons in September to 59,000 odd in October. The Granby Consolidated Mining & Smelting Co.'s Mines at Cassidy, Vancouver Island, have about doubled their production, the October returns showing 11,591 tons.

The complete returns for the month of October follow:

Crow's Nest Pass Field.

	Tons.
Coal Creek, Crow's Nest Pass Coal Co.	41,294
Michel, Crow's Nest Pass Coal Co.	22,147
Corbin, Corbin Coal & Coke Co.	12,359

Nicola-Princeton Field.

Middlesboro Colliery	9,809
Fleming Colliery	3,181
Coalmont Coal & Coke Co.	401
Princeton Coal & Land Co.	2,371

Vancouver Island Field.

Canadian Western Fuel Co.	59,404
Canadian Collieries (D), Ltd., Comox	49,354
Do., Extension	18,811
Do., South Wellington	7,709
Pacific Coast Coal Mines, South Wellington	4,862
B.C. Coal Mining. Co. (Jingle Pot)	3,399
Nanoose Collieries	3,909
Granby Cons. Mining & Smelting Co., Cassidy.	11,591

BRITISH COLUMBIA'S OLDEST MINER, ROBERT STEVENSON

In attendance at all the functions of the Canadian Mining Institute meeting at Vancouver recently, and enjoying the uproarious fun of the smoker as heartily as the youngest man present, was Mr. Robert Stevenson, who received many congratulations.

The Vaucouver "Daily Province" published the following account of Mr. Stevenson's pioneering work in B. C. mining, which is of such general interest as to merit a wider circulation:

"Attending the mining convention is the oldest in point of mining experience and in years, and still actively engaged in this industry.

Pioneer of the Cariboo, Robert Stevenson, hale and active, is 81 years of age. He is well posted on mining topics of to-day, and is heavily interested in quartz propositions in the Simikameen. He makes his headquarters at Princeton every season. In fact his activity in looking after his properties in that promising mining district, and pushing the development to the producing stage would give an object lesson to much younger men in many other walks of life.

Mr. Stevenson's experiences of the Cariboo, date back to the spring of 1860, when he left Osoyoos, on the international boundary and made his way over the Cariboo trail. He had been collector of customs at Osoyoos from shortly after his arrival in British Columbia in 1859, until the lure of the rich placers of Antler, Quesnel and Barkerville, threw their spell over his imagination and he joined the north-bound caravans. Sixteen years of life in the Cariboo country saw the decline of Canada's first great placer camps. The gravel of the original creeks was all sluiced and the last dust panned.

Then Robert Stevenson removed to Chilliwack and married. He soon became interested in the Similkameen district, where he has since been active in mining. He makes his home in Chilliwack, coming there "to visit his family" as he himself puts it.

"I can ride a horse as well to-day as ever I could and as I find tramping in the hills is harder on me than it used to be. I usually make my trips on horseback," said Mr. Stevenson to a representative of The Province. "It is an advantage, for I can take a horse anywhere in the district, and get over more ground than if on foot. It takes me much less time that way,, and while I do not belong to any union, I am in favor of shorter hours as I grow older."

With Col. Donald MacGregor, Mr. Stevenson is one of the very last of the originals who worked in the old Cariboo diggings. A year older than Col. MacGregor, who only admits four-score, Mr. Stevenson, who is a powerfully-built, heavy-set man, under average weight, forms a sharp contrast to the tall spare form of his old Cariboo friend. His brother, John Stevenson, who died a few months ago after a service of twenty-two years as sheriff of Cariboo, and the old partners, May and McLean, who died in the Cariboo,

shortly after, were among the last of the old guard to remain.

Many an interesting tale of the old diggings and camps is recalled by Mr. Stevenson, as he chats of the early years of his romantic career. Conspicuously among these experiences stands out the well-known account of the "lost diggings" in the far interior, which out-Cariboo the richest claims of Cariboo's best days, and Mr. Stevenson is now the only living man who knows the location. The many causes contributing to these wonderful diggings being left untouched in all the years since the death of John Rose, who located them, form an absorbing chapter of history.

"I can find them even yet," said Mr. Stevenson, in talking of the rich find which in the end cost the life of Rose and his partner, Johnston. "I was the last man with Rose and Johnston when they set off in the spring of 1862, to return to their new diggings, which they had prospected and worked the previous year. They left from the old Antler camp—not a trace of which now remains, but where I am told much mining activity has been going on the past season.

"Rose and Johnston outfitted and took nearly twice the ordinary season's supplies on a double-decked raft or barge they built. I recall as if it were yesteday, walking down to the side of the creek, where they had their raft moord. We each carried a few last supplies. Rose turned to me, and pointing to a young man, a stranger to the camp, said, "I have invited this young man to come along. He tells me he has no money, no outfit, no blankets, not even a coat. But he looks a likely fellow, and will be a great help.

"From that moment Rose and Johnston were never again seen nor heard of. Twenty-five years later a friend of mine met a man in Portland who was, he said, on his way to the Cariboo to re-locate the old Rose diggings. He told my friend he had been the third man in Rose's ill-fated party of the spring of 1862,, and had been living in the States since that year, but had never been able to return. He invited my friend to follow and join him in the quest. But my friend could not leave Victoria. No trace of the stranger was ever again found. To this day may firm belief is that he was the young man Rose picked up the spring morning I bade him good-bye.

"But Rose had confided in me the exact location of the wonderfully rich diggings he had found, and which he said would carry a camp of several thousand men. I have never yet been able to go," ended Mr. Stevenson wistfully, "but can still locate the place."

Strong in his faith in the value of the undiscovered placer field, and in his own ability to locate it, Mr. Stevenson still cherishes the hope to be able to make the trip some day, and he is equally confident that he is as fit as many a younger prospector for the arduous season's campaign it would mean. But he will not reveal the secret of Rose's diggings.

Map of the Anyox District, B. C.

We have received a contoured map of the vicinity of Anyox, British Columbia, situated on Observatory Inlet. The map, on a scale of 1,000 feet to the inch, shows the layout of the Anyox Smelter, and the adjoining community, together with the railway, compressed air line and the buildings around the Hidden Creek Mne of the Granby Consolidated Smelting Co. Copies can be obtained from the Mines Branch at Ottawa. Publication No. is 1706.

Nova Scotia Notes

Loch Lomond Coalfield, Cape Breton

Reports in the Sydney newspapers refer to the Loch Lomond and Glengarry coalfield, and intimate that some of the larger coal companies in Cape Breton are interesting themselves in the area—a report which was later denied.

This report evidently refers to the small synclinal basin, an outlier of the main Sydney field, which lies not far from the eastern shore of the East Bay of the Bras d'Or Lake, back of Big Pond. A description and map of this small coal occurrence will be found on page 8 of Mr. J. F. K. Brown's memoir on the "Mining of Thin Coal Seams as applied to the Eastern Coalfields of Canada."* Mr. Brown calculates a possible coal content of 28,000,000 tons in the area. It is, however, one of those coal areas remote from transportation, containing thin and not easily mined seams, which form part of the natural coal reserves of a country, and which, in due time, will appreciate in value, but is not of great importance while large and undeveloped coal areas exist within easy reacch of present colliery equipment.

The most interesting part of this coal occurrence is connected with the existence of a thin strip of carboniferous measures bordering the shores of the East Bay, which suggests the possibility that some day coal seams may be found underlying the waters of the Bras d'Or Lake.

*Note.—Bulletin No. 14, Mines Branch, Ottawa.

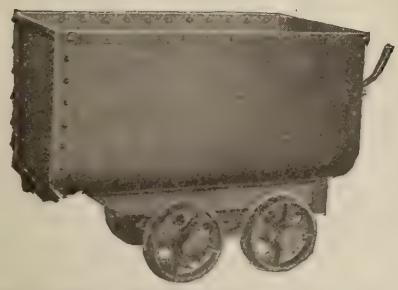
Labour Matters

The negotiations between the coal operators and the U. M. W. are reported to be proceeding satisfactorily, with the promise of amicable settlement before the end of the year.

G. B. Burchell to Operate the Fenwick Mine

It is understood that Mr. George B. Burchell, General Manager of the Bras d'Or Coal Co., has taken over the operation of the Fenwick Colliery, in the Cumberland Field, in which the Provincial Government became financially interested during the urgent coal shortage of two winters ago. Mr. Burchell has been very successful in operating small collieries, and previous to taking over management of the Bras d'Or Mine he was for a number of years in charge of operations in the Joggins Field.

The small companies, including the Indian Cove Mine at North Sydney, the Bras d'Or Coal Company, also at North Sydney; the operations of Mr. Malcolm Beaton and partners at Port Hood, and of the Greenwood and Milford Companies in the Pictou Field have latterly been quite busy, and production during the last quarter of the year will be appreciably helped by the output of these minor operators. It is also understood that the New Campbellton Mine, in which Mr. John C. Douglas, M. P., is interested, has recently increased its production and is making satisfactory progress.



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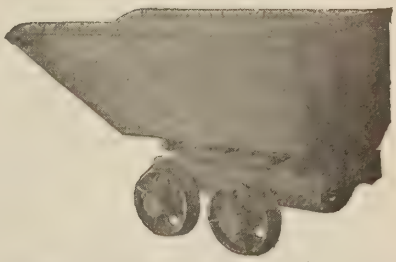

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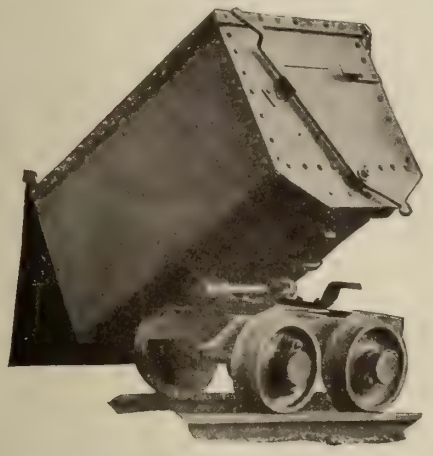

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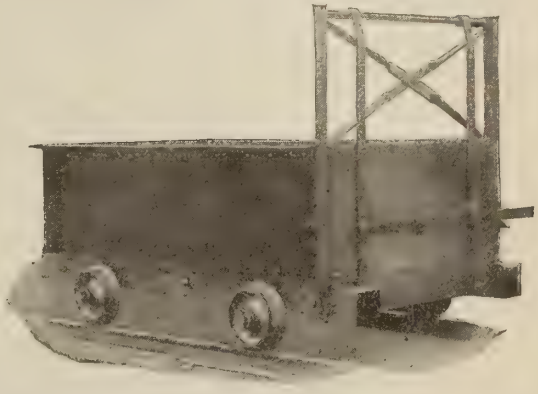

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Workmen's Compensation Laws

One of the matters in which complete concurrence of opinion was obtained at the Industrial Conference in Ottawa was regarding the necessity for tne standardization of workmen's compensation laws in Canada.

The essential fairness of compensation for injuries sustained during the course of employment is not today a matter for dispute. It may be regarded as generally accepted.

There are two main divisions of administration of a compensation law. The first is based on the original British enactment, which provides for the payment of compensation for injuries received and for fatal accidents, where dependents are left, but leaves the payment of compensation to be arranged between the employer and the employee, with recourse to the courts in case of disagreement. This method of administration usually carries with it lump sum payments of compensation.

The second mode of administration is vested in a commission, which has absolute power to determine the compensation payable, under the prescription of the act, and permits no recourse to the courts. Administration by a state commission usually includes collective assessment of industries by groups, the rate being at the discretion of the Commission, and monthly payments and pensions in lieu of lump sum payment.

Administration by a state board has the following features to recommend it. It entirely eliminates recourse to the courts and avoids the necessity for the employment of lawyers. No direct contact between the employer and the employee is required, and no questions requiring agreement or disagreement between them are raised. Medical diagnosis of injuries rests with the medical officers of the state board, and in this regard a fruitful field of non-agreement is avoided. Monthly payments of compensation for injury correspond approximately with the periodical receipt of earnings, and avoids all the abuses and disasters that accompany lump payments of compensation. The payment of comparatively large sums of money to persons unable to expend it wisely has nothing to recommend it, and much to condemn it.

The administration of a compensation law by a state board is a logical evolution from the acceptance of the principle that compensation for occupational injury is a charge against the industry as a whole. The evils of bureaucratic control are admitted and well-known, but if we accept the foregoing postulate, there is no other way by which industry, as a whole, can be fairly and equitably assessed for compensation for injuries received in industry.

From the employers' side, we believe there is much to be said for the manner in which workmen's compensation is assessed and disbursed in Ontario, Nova Scotia and British Columbia. The method of group and collective assessment, after some years of experience, enables the cost of compensation to be assessed upon the payrolls with precision, and within a limited range, and in this way, employers are relieved from the uncertainty of judicial decisions, and the necessity for legal consultation and payments. In the objections which accompany the working of a compensation law such as is in force in the Province of Quebec, employers should not fail to reckon the time spent by executives in contesting conpensation cases.

The Report of the Ontario Compensation Board for 1918 contains the following:

"Complaint is made by some members of the legal "profession that they are ruled out of practice in con- "nection with claims under the Workmen's Compen- "sation Act. The Board feels that this is in accor- "dance with the spirit and intention of the Act."

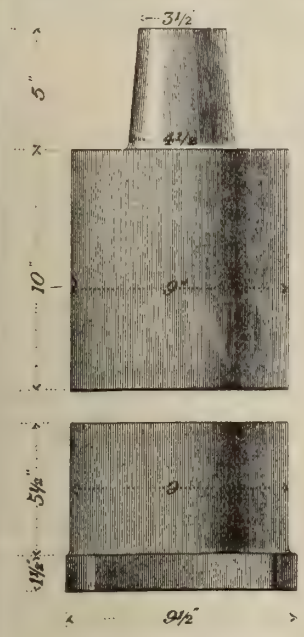
In the Quebec Court of Appeal, during the sitting of the 28th October, Mr. Justice Martin, in rendering judgment in a compensation case, called attention to the fact that it had taken nine judges, nine doctors and four lawyers nearly four years to determine the nature and extent of the respondent workmen's injuries. His Lordship remarked that he quite appreciated that it was the function of a judge to interpret the law as he found it, and perhaps he ought not to suggest any changes or reforms in the law as made. "But, in the light of the facts I have mentioned." said Justice Martin, "I feel safe in asserting that if a Commissioner was to administer this Act with the assistance of an independent medical board, he would have settled and determined the whole matter in dispute between the parties in three hours."

Lawyers as a class would be the last to suggest that statutes should be framed to give them the maximum employment, and the moral pointed by these parallel statements requires no elaboration.

Not only does administration by a Workmen's Compensation Board provide impartial handling, but it leads to expeditious and skilful handling. The administrative and medical officers of a Compensation Board, handling many thousands of cases in a year, become as impersonal, as correct, and as skilful in their work as fallible men can hope to become.

No cheaper or more equitable form of administration is possible. As the 1917 Ontario Report puts it: "Practically all the money contributed by employers goes to workmen or their dependents as compensation. The administrative body has no motive to give the workmen less than he is entitled to, and no motive to charge the employer more than he should pay."

From the workmen's point of view, there is no convincing reason that can be given to him why he should receive differing treatment in regard to compensation for injury, according as he may be injured on this or that side of a provincial boundary.



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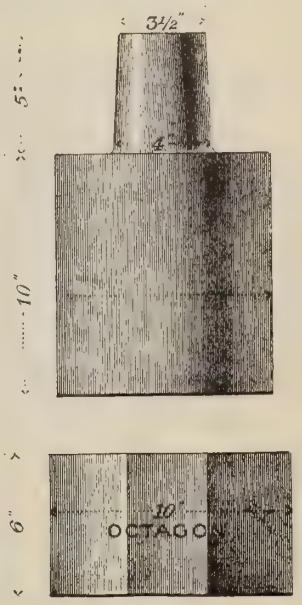

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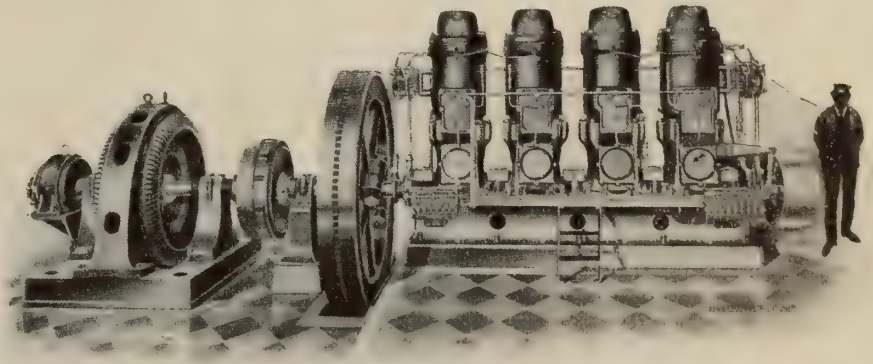

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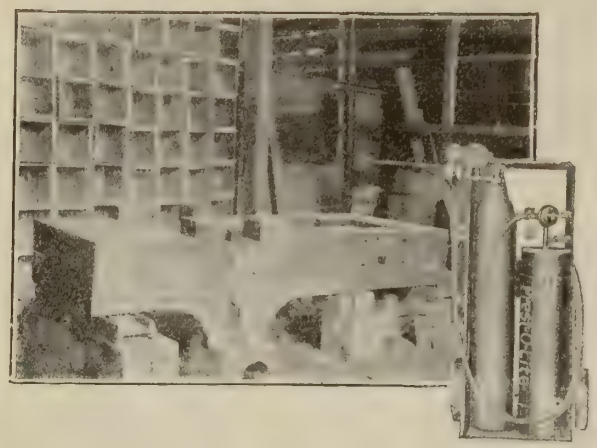

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From the employer's viewpoint, it should not be forgotten that such compensation statutes as exist in Ontario, Nova Scotia, British Columbia and Alberta, take away from the workmen all common law rights by virtue of the privileges conferred in the compensation acts of those provinces. Common law liability is an uncertain and erratic one, and in some industries—most industries in fact—the menace of common law liability, as interpreted by a jury, is not to be preferred to an all-inclusive payroll assessment for compensation purposes, administered by a skilful and neutral state board which eliminates every unnecessary expenditure in administration, and avoids all issues of possible disagreement with injured workmen, or their dependents.

There is another point. Employers are human, and oftener than may be admitted by some pehaps, are humane, and the contesting of a compensation case is in many instances a distasteful business that most executives would be glad to be relieved of.—From *Iron & Steel of Canada.*

Pocket Manual on Fire-Damp Testing, Issued by the B. C. Mines Dept.

The "Journal" has received, with the compliments of the Minister of Mines for British Columbia, a very neat and handy pocket-manual of instructions in testing for fire-damp in coal mines. The heights of cap corresponding to certain ascertained percentages of fire-damp are shown by two diagrams, the flame being shown in red, and the gas-cap in blue. An interesting feature is the difference in the size of the gas-cap for the same percentages of inflammable gas (methane) in the air between the Coast and Nicola Valley Districts and the Crowsnest Pass Mines. For example a 2½ per cent content of fire-damp in the Crowsnest Pass mines will show a 5/16ths cap, where the same percentage of fire-damp in the Coast Mines would cause a half-inch cap. It is stated by those who work in the Crowsnest District that the mine gases there contain a remarkably high percentage of ethane.

The little manual of the Mines Department is contained in a buckram envelope, and is thus protected for carrying round in the vest-pocket.

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EDITORIAL

The Undersea Extension of the Cape Breton Coalfield

A public discussion of the problems connected with the extraction of coal from the undersea coalfield of Cape Breton Island is not to be lightly undertaken without compelling reasons, for the subject bristles with difficulties, and is likely to bring in its train more kicks than ha'pence.

The public interest involved is, however, of precisely such a compelling nature as to justify some plain statements for the purpose of correcting a widespread misunderstanding of the reasons which caused the Nova Scotia Legislature to provide the machinery for the appointment of a Commission of Enquiry into the effect of the existing arrangement of the undersea lease lines upon the workability of the submarine coalfield.

There are two main sets of considerations involved. namely, legal questions, and engineering problems. So far, much prominence has been given to the legal aspects of the lease arrangements, but next to nothing has been heard of the engineering questions. Now it really happens that the primary and deciding questions are those connected with the actual winning of the coal from the undersea territory, and all the legal difficulties that have been so seriously discussed are secondary in importance, and will in fact not arise at all if the engineering problems are first examined in sincerity and decided on their technical merits.

It has been assumed that if the corporate interests that are now believed to conflict—an entirely incorrect belief in our opinion—were reconciled, that the existing difficulties would disappear. This is only partially true, because the lease difficulty is only one phase of the problem, and in this connection we would remark that the physical configuration and arrangement of the undersea lease lines is so contrary to any arrangement that ordinary good mining practice would call for, that it has only to be explained and understood to ensure that its palpable absurdity will prevent its continuance.

The undersea extension of the Sydney coalfields is much larger in extent than the land area, and it is, we believe the most valuable and important undersea coal deposit in known existence. The conservation of this deposit is therefore of great relative importance, but to the Province of Nova Scotia it is all important, and we believe the people of that province thoroughly approve of the intention of the Local Government to appoint a competent commission, but the public will desire to have *all* the problems of the undersea coal area reviewed at this time.

The very best advice that can be obtained should be secured, and there should be no hesitancy on the score of expense in retaining the most eminent engineers known to the profession of mining.

We would emphasise the point that the problem is primarily and in all important respects an engineering one, and that none but engineers can pass upon it usefully.

Briefly the problem is this. How can the undersea coal—as yet largely intact—be mined so as to ensure that it shall be mined to the last ton, at the lowest cost, and so as to preserve the accessibility of the remoter areas in view of possible advances in the arts, and in motive powers, that may permit coal to be extracted at indefinite distances from the shore?

Long views are needed, unbiased opinions, and competent conceptions of scientific breadth and understanding. The task is worthy of the greatest masters of the science and art of mining, and if the Government will rise to the full necessities of the case, the Province will back them, and future generations of miners will acclaim their wisdom and foresight.

The present unfortunate set of conditions is nobody's fault. It is the accidental and purposeless outgrowth of years, and just happened. Any recrimination of past administrators of the public domain of the Province would be inviduous and very unfair, because any fool can be wise after the event. But the future of the submarine coalfield is not yet endangered, it being fortunately, as we have already stated, largely intact, and the Government is presently empowered to review the facts, aided by the most competent advice, and to apply such remedies as full enquiry may disclose to be applicable.

The duty imposed upon the Government of Nova Scotia is unpleasant, but it is also inescapable, and the longer the undertaking of the duty is deferred, the less happy will be the ultimate result.

Some Problems Associated with the Undersea Coalfield of Cape Breton Island

Problems Include Necessity for Re-arrangement of the Mining Privileges, Preservation of Accessibility of Remote Undersea Coal-Bearing Areas, Loss of Coal in Pillarage, Possibility of Introducing Longwall Methods and Hydraulic Stowing of Coal—Immediate Appointment of Enquiry is Urged

By THE EDITOR*

A year ago the writer expressed the opinion that the whole question of the submarine coalfield was due for review.

In the meantime, much has been said and written on this vexed question, but, unfortunately, the real point at issue has been obscured by the conflicting business aims of the two large companies which between them hold the bulk of the undersea leases lying off the eastern shores of Cape Breton Island.

The word controversy has been freely used, and it has been assumed by some, and unthinkingly accepted by many, that some dispute—the word has been used on many occasions—existed between the two rival coal companies. This assumption is wide of the mark. There is no dispute, but there is a very real and pressing problem. This problem, which the Nova Scotia Government, by virtue of the legislation of 1919, undertook to solve, and was duly authorized and instructed by both houses of parliament to solve, is much wider and graver than any conflict of interest between two commercial rivals. In order that our readers may be under no misapprehension of what is really at stake, it is necessary to make a considerable quotation from last year's review. The writer urged the appointment of a competent commission, as follows:

"A plan should be made of the whole coalfield "from Cape Dauphin to Mira Bay showing the exist- "ing submarine workings, the course of the land and "submarine outcrops, the course and nature so far "as known of the parallel folds and faults that trav- "erse the coalfield. Due consideration should be "given to the facts as disclosed by soundings at sea, "the nature of the sea-bottom, the depths of super- "incumbent strata, the spacing of the coal-seams, and "the probable extent of the submarine coalfield.

"The plan should be viewed as a whole by compe- "tent mining engineers, who should disabuse their "minds of any questions concerning lease lines, and "it should be conceived as one operation, from the "viewpoint of the owners of the coal, not the view- "point of the leaseholders.

"The conservation of the submarine coal, its pro- "tection from inundation, creep, incompetent mining, "and the preservation of its accessibility over the "maximum period of operation, should be the guid- "ing ideas, and, if this were done, it is certain that "a radical re-arrangement of the submarine leases "would result that would benefit everyboly concerned, "even those competing coal operators who do not "today apprehend the true significance of the signs "of the decadence of the local coal industry, and the "necessity for compromise and reasonableness unless "all alike are to be involved in a common future dis- "aster."

There are other matters in connection with the operation of the undersea coal areas, which the people of the Province of Nova Scotia are so fortunate as to own, that are not mentioned in the foregoing summary, and it seems proper, seeing that the Government is now empowered to appoint a Commission of Enquiry, to mention these additional considerations.

The existing regulations regarding the extraction of coal in undersea areas, which are part of the statutory law of the Coal Mines Regulation Act, prescribe the practice to be followed until a cover of 500 feet of solid strata has been attained. Beyond that depth of cover the system adopted must have the approval of the Mines Office.

Methods of Extraction Should Be Reviewed

So far, the method of extraction has been that of pillar and stall, which necessitates the leaving of pillars, the size of which is increased as the workings progress seawards, and is a matter of agreement between the operator and the Inspector of Mines. Large areas of wrought territory are today standing on pillars and one matter that would form a proper question for investigation is whether the present system of pillar and stall mining is a necessary one, or the best one to be followed. Writing in 1916, the writer stated:

"If it is found necessary to leave permanent pillars "in submarine workings, this will entail the com- "plete loss of the coal contained in the pillars, and it "will also bring into operation the limitation of ex- "traction by the increased cost of mining at an ear- "lier date than if it is found possible to dispense with "permanent pillars, as the existence of a large area "of permanently abandoned workings supported by "pillars increases all mining costs, particularly that "of ventilation, and adds an element of danger that "is not present where the abandoned waste is com- "pletely filled, either by complete subsidence of the "roof, or by some method of stowing."

There are two instances in Canada where undersea coal is being completely extracted by the longwall method in one operation without leaving any pillars, and there can be no question of the advantages of such a method, whereever it is possible, as it ensures complete recovery of the coal, and moreover, it lessens the danger of inundation from the sea by breaks in the overlying strata, because it ensures an even and gentle subsidence of the roof. In neither of the Canadian instances in point is the thickness of the coal seam

*—Being a portion of an article prepared for the New Year edition of the "Halifax Chronicle."

so great as in the case in, for example, the Sydney Main Seam at Sydney Mines, or the Phalen Seam at Glace Bay. In Britain, very large areas of undersea coal have been successfully extracted by the longwall method; and in at least one colliery, which is under the direction of a former official of the Dominion Coal Company, the space from which the coal has been extracted—known to miners as the goaf or waste—is filled with sand and other suitable substances carried in by water, a system known as hydraulic stowing.

There are some serious technical difficulties in adapting the longwall method to a thick seam, but they are not by any means insuperable, and seams quite as thick as those which have been hitherto most extensively worked in the undersea areas off Cape Breton Island are being successfully extracted by the longwall method elsewhere. It should also be borne in mind that there are at least four seams, of somewhat lesser thickness than those hitherto worked under the sea in the Sydney field, that will some day be mined, when their turn comes, and there is no apparent reason why these seams could not be worked in one extraction without leaving pillars throughout their entire land and accessible seaward extension.

Reasons Why Submarine Problem Has Arisen

In regard to the arrangement of the leases, which the Government has recognized as being in need of remedy, and which, as the Hon. Commissioner of Mines has stated, will, if not altered "make the devel-"opment and operation of some of these areas diffi-"cult and economically impossible," it may be of technical interest to enquire why this unfortunate situation should have arisen, and some consideration of the circumstances will reveal that it has come about through the ignoring of three main principles of accepted mining. These three omissions are:

a. The statutory limitation of the discretionary powers of the Commissioner of Mines.

b. The non-application of the principle of "discovery."

c. The failure to recognize, in time, the importance of the ownership powers residing in the access to undersea minerals through the foreshore.

In what does the right of the Province of Nova Scotia to lease coal areas under the waters of the sea consist? Primarily, of course, in its ownership of the foreshore, or, to put it still more exactly, in its control of the means of access to the coal. Ownership of coal seams under the sea is a meaningless claim unless it includes free access thereto, and consequently, ownership of undersea minerals is inseparable from, and is in fact synonymous with access to these deposits.

Access being so primary a consideration, what follows? That to each advantageous point of access on the seashore there should be attached, for the purposes of mining, **all the undersea coal which can be best and most economically mined to that point of access.**

What has actually occurred? Undersea coal areas have been leased in detached blocks miles out to sea, not only without regard to the means of access, but worse still, so leased as to **block and to prevent access.**

Still less understandable, and certainly indefensible, is the fact that undersea coal areas have been leased in shapes that will prevent their being mined commercially, but most extraordinary is it to find that some of the worst examples of impractically and absurdly shaped leases are plotted on the lease map four and five miles out to sea!

It cannot be said that a system of leasing which not only permits such absurdities, but **causes** them is not in need of abolition.

It is open to doubt that where—as already shown—the only actual value of the undersea coalfield to the Province resides in its ownership of the foreshore, where the coalseams dip under the sea and give access to the seaward coal, whether the Province had any actual prescription to do more than grant permission to a chosen operator on a given and defined stretch of foreshore to mine all the coal that it is possible for him to extract seawards.

In Great Britain, the question of the ownership of the undersea coal has not been raised, because it has been realized that it necessarily attaches to the ownership of the foreshore. Each operator in Great Britain, along a given stretch of foreshore, mines coal from under the sea by virtue of a special lease from the Crown, applicable to his particular circumstances, and the requirements of the locality, and capable of modification to meet changing conditions. The representative of the Crown is therefore an officer with discretionary powers, and it is his duty to make the best possible bargain for the Crown that each individual set of conditions will allow.

Commissioner of Mines in Nova Scotia Has No Discretionary Powers

The position of the Commissioner of Mines for Nova Scotia, under the existing lease laws, gives him no discretionary powers whatever. His office consists in applying a hard and fast general regulation to varying conditions of great complexity connected with the leasing of coal under the sea, such general regulation having been originally designed to cover the conditions connected with the leasing of coal under land areas, and even then, applicable to only one set of circumstances. No matter how impracticable from the point of operation, nor how injurious to the interests of the Province an application for an undersea lease might be, if the application is legally made as to form, and the statutory lease rental is proferred, the Commissioner of Mines can do nothing but issue the lease. The Crown therefore has no protection against application for leases designed to block the mining operations of a competitor, **and such leases have been issued on a number of occasions.**

It is much to be questioned whether any undersea lease which has been issued by the Crown in Nova Scotia is tenable except as it retains contact with and access to the shore. The old and generally accepted principle of "discovery" in mineral claims could very well be applied to the privilege of mining the undersea coal seams.

When the Crown leases an area under the sea presumed to contain coal, is the "lease" really anything more than priority of permission to mine coal when "discovery" actually takes place? Can it be more, when the presence of coal in such a position cannot be demonstrated at the time of issuing the "lease," and is nothing more than a presumption regarding the unknown proceeding from analogy to the known?

What possible right, in fact, can the Crown possess to **lease**—in the usual understanding of that term—coal which is merely presumed to be contained in measures underlying the waters of the ocean in a detached

block situated four miles from shore? What right or justification can be advanced for leasing a detached block, such as that referred to, contained within such boundaries and having such a configuration as to render the block unworkable, and also to render unworkable the adjoining areas of other lessees should coal ultimately be discovered in the unknown area?

Leases have been given of detached blocks under the sea which were entirely surrounded by the holdings of other lessees. It is evident that a "lease" given under such conditions is in reality untenable, and is in fact not a lease at all. The Government sought to remedy this anomaly by enacting legislation which permits the lessee of a detached area to proceed through an intervening lease for the purpose of gaining access to the detached area, but the consent of the lessee of the intervening area must first be obtained and a compensation awarded for the passage. Such a method of access is however impracticable, because, firstly, it is bad mining practice and too costly, and, secondly, it would result in cutting up the intervening coal leases into a series of up-get-at-able "islands" of coal, absolutely unmineable, and of not use to anyone—indeed much worse than useless.

Should not the Government of Nova Scotia, which, by a series of fortunate accidents has inherited the ownership of the coal-seams, exercise the ordinary discretionary powers of a real estate agent in disposing of the property of the people of Nova Scotia, of which it is the steward and guardian?

Does it not seem as if the policy of the Government has been wrong, not only from the viewpoint of commonsense and engineering—the terms are interchangeable—but wrong fundamentally? Has not the lease law, designed for minerals underlying the land, been in error assumed to apply to undersea minerals, and has not the Government attempted to convey to lessees certain rights which have no certain existence? To put it another way, has not the Government issued documents giving priority of permission to mine coal in areas where it is not certain that coal exists? Has not the whole matter of the undersea coal leases been an unfortunate misconception, on which blunders have been founded which happily it is not yet too late to correct?

The Government cannot remedy the existing lease law by any half measures. It is so bad that it cannot be mended. It should be ended. An entirely new method of granting undersea mining privileges must be devised.

Apply the Principle of "Continuous Discovery"

If the principle of access is made the basis of the new arrangement, then the principle of "discovery" can be well applied by granting permission to mine coal in undersea territory to the operator whose colliery workings first reach the coal, which would mean the application of the principle of "continuous discovery," and would have as a result continuous development of the undersea coalfield under the most desirable conditions.

Commissioner of Mines Should Have Real Powers

The Commissioner of Mines should be given absolute discretionary powers, not only in the matter of granting permits to mine coal, but also in the application of the submarine law. The present hard and fast statutory regulations should be withdrawn. In any case they have no place in the Coal Mines Regulation Act. In lieu thereof the Mines Office should be vested with complete discretionary powers, which will permit of the conditions of supervision being varied and the regulations being modified to suit the ever-varying and progressive conditions of undersea coal-mining, and the widely different physical conditions accompanying the presence of coal in the several submarine coalfields. For example, it is obvious that a law which is suited to the conditions of deposition and strata existing in the Sydney coalfield is quite unsuited to the conditions at Inverness.

Let the Commissioner of Mines be given real powers. Put him in the position to act as the steward and agent of the people. No longer let his hands be tied by the dead hand of precedent, falsely and erroneously applied to conditions that have no precedent.

Past Errors Should Not Spoil the Future

Because the Government has erred in ignorance, because many men now dead have made omissions, and because certain priorities have been conferred that do not represent absolutely demonstrable values, should this error be persisted in if it means the gradual destruction of the greatest asset of the Province, the undersea coalfield of Cape Breton? This, and nothing less, will be the result of attempting to mine coal to conform with the jigsaw puzzle that is dignified by the name of the lease map of the undersea coalfield of Cape Breton.

Recall the leases of the undersea coalfield, and then re-arrange the mine territories so as to permit the workings of the existing collieries to proceed to sea as far as may prove possible. The "leases" should not be dignified by such a name. They are actually permits to mine coal on the payment of a certain royalty per ton, and the royalty could just as well be levied as a "wayleave" on each ton of coal that emerges through the shore line from an undersea colliery.

Give Maximum Life to All Existing and Future Collieries

Where stretches of the foreshore are as yet unoccupied by collieries, provide that every new colliery approved by the Commissioner of Mines shall be given free access to all the seaward coal. Lease colliery sites on the seashore, and with them submarine areas designed to give the maximum life and the maximum extraction of coal to each colliery, and abandon the the practice of leasing unmineable and detached areas of impracticable shape situated anywhere and nowhere in particular.

Problem Must Be Solved Now or Never

The problem is capable of solution today, because only two or three of the undersea coal seams have been mined in the subarine areas. In some sections of the coalfield, however, there are from seven to eight workable seams, the working of which, under existing conditions would complicate the problem to an inextricable degree. A solution is possible, moreover, without endangering the vested rights or the bonded assets of any individual or corporation. A re-arrangement of mineable areas is possible that will greatly enhance the assets and increase the stability of all the interested parties, for of what use to any corporation are areas that are not mineable at a profit, and in some instances probably not mineable at all, if present conditions are permitted to continue?

Competent Commission of Enquiry Should Be Immediately Appointed

The Government should proceed to appoint the Commission of Enquiry which is authorized by Parliament, and should extend the scope of its enquiry to include all the problems of the submarine coalfield. Fortunately, in this instance the best interest of the Province is also the best interest of the operators mostly concerned, as will speedily become apparent if a scientific, impartial and complete survey of the problem is undertaken by competent persons.

MINING COAL AT GREAT DEPTH.

Sir William E. Carforth, in an address recently delivered before the Yorkshire Geological Society made some references to the problems of mining coal at great depth which are very applicable to the problems of mining coal in the undersea coalfields of Cape Breton Island, where not only will it be necessary in the future to mine coal under great depth of cover, but also at point remote from the point of entrance or generation of motive power and fresh air for ventilation.

Sir William, whose services to coal mining are such as to make his opinions carry great weight, said in the course of his remarks that modern mining had proved that in deep mines, pillars of coal became crushed and caused other complications if left in the old method of working by pillar and stall. Hence had been substituted the long-wall method with its numerous modifications of getting the coal by one operation. Deep mining had already demanded the discarding of many usages of working coal. In future, if deep coal seams were to be successfully won, a practical knowledge and utilization of certain natural laws and their effects would be obligatory to colliery officials and workmen. Whilst the long-wall method had displaced the pillar and stall system, yet the sinuous or crooked long-wall face had until recent years unfortunately been maintained in many collieries. Sir William described some of the advantages of cutting coal by machinery, the most important of which he indicated, were the reduced risk of accidents to the miners, fewer subsidences affecting surface property, and greatly increased output, per man per shift. The straight line of coal face had also opened the way for the introduction of further mechanical appliances, and the use of conveyors or continuous troughs, which enabled the collier to throw his coal from the face right on the conveyor, instead of having to fill it into tubs, and afterwards tram or push the tub for some distance to the pony road, whence it was conveyed to the mechanical haulage road. Whilst a miner with a pick and shovel was only able to get about 3¼ tons of coal per shift, with the help of coal-cutters he was able to get about 6¼ tons. With coal-cutters and conveyors combined, the production of coal per man per shift had increased to as much as 8 to 10 tons. If the thick seams of the West Riding coalfield, he said, had been to a great extent exhausted during the past 150 years, then the coal to supply domestic and industrial requirements would have to be from the thinner seams. He suggested that the question of cheap fuel in the future should form a subject for the consideration of geologists, a special class of engineers, and of mining students at the universities and technical schools. Mechanical means must be found for conveying coal long distances underground. Discussing the question of reducing temperatures so that the deepest coal seams could be worked, Sir William suggested that the experience and knowledge of the makers of modern refrigerators and of cold storage experts should be made use of. He thought compressed air, which had proved a useful means of obtaining power in working haulage engines, pumps, and other appliances, would prove of equal service in reducing the temperature of mines.

Sir William's remarks on the smaller damage to the surface, and this applies of course whether the surface is submerged or not, is direct confirmation of the views we have expressed in the "Journal" as to the suitability of the longwall system of coal extraction to the seams of the undersea extension of the Cape Breton coalfield.

Another suggestion made by Sir William is that the question of cheap fuel should be made a subject of special study by geologists, a special class of engineers and mining students. Dean Brock of the University of British Columbia recently remarked that the study of our coal deposits had been greatly neglected by geologists in Canada, and Dean Brock is right. For example the stratigraphical position of the Cape Breton coal deposits has never been fixed with absolute certainty, no really exhaustive examination of the paleontology of this deposit has ever been undertaken in recent years, no study of the earth movements has ever been attempted, and no more is known with regard to the correlation of the several basins of the Cape Breton coalfield, to say nothing of the correlation of the coalfields of Nova Scotia, than was known to Richard Brown, Sir J. W. Dawson and Sir Charles Lyell. In short, no attempt has been made to apply the greatly enlarged knowledge of coal geology that has come with recent years to any one of the coalfields of Canada. The Geological Survey has done its best, but its personnel is too limited, and the salaries which are paid to its officers are a fair index to the importance which the Canadian people attaches to economic geology. And yet, to crack an old joke, there are some people who are fools enough to put stock in these things.—Ed.

CATALOGS RECEIVED.

The Link-Belt Co. of Chicago has issued "Book No. 380, Link-Belt Electric Hoists and Overhead Cranes" and No. 375, Link-Belt Labor-Saving Elevators and Conveyors." These catalogues are fully illustrated with industrial applications of the well-known products of the Link-Belt Co.

The Aeroil Burner Co. of 400 Main St. Union Hill, New Jersey, U. S. A., issue an illustrated pamphlet describing a flame-projector device for thawing cars, hoppers, pockets, tracks, etc., which should prove extremely useful around mining yards and buildings in Winter. They seem well adapted for colliery railway yards, particularly where it is necessary to clean up switches and release traffic quickly.

The League of Nations seems to have gone a glimmering, largely through a misunderstanding by Europeans of President Wilson's powers. They conceived him to be the fully accredited representative and plenipotentiary of the nation of which he is President, but apparently that is not the case—and more's the pity.

NICKEL COINAGE AND CANADA'S NATIONAL METAL

In a letter to The Globe, published today, Professor W. G. Miller, Provincial Geologist of Ontario, makes out a strong case for the adoption of nickel coinage for Canada. He sums up his argument with these reasons: —"Nickel is the most beautiful and the most durable metal for minor coins; ;it cannot be successfully counterfeited, and it can be called Canada's national metal, since this country produces over 80 per cent of the world's output."

Commenting upon a former Globe editorial on the subject, Professor Miller says that coins of pure nickel or nickel alloys are in use by over fifty countries, Britain and Canada being "almost the only important countries that have not employed nickel in coinage." That is not very flattering to Canada, at any rate. The conservatism of Britain is not so surprising. That Canada, with the raw material within her own borders, should in the matter of nickel coinage lag behind countries that do not produce nickel is as much a matter for wonder now as it was in the days when the project was first urged, and was brushed aside on various unconvincing pretexts.—*The Toronto Globe.*

Dr. Miller's Letter.

To the Editor of The Globe: During the last month the subject of nickel coinage has been receiving much attention from the press of Toronto and elsewhere. Your own editorial of the 12th instant induces me to address you on the subject. There are a few points concerning which there seems to be a misapprehension:

(1) France is not now introducing nickel coinage. She has been using it for years. In fact, Great Britain and Canada are almost the only important countries that have not employed nickel in coinage. Coins of pure nickel or of nickel alloys are in use by over fifty countries.

(2) Nickel coinage will consume only a small proportion of the nickel produced. Although this coinage has long been in use, it is believed that the total nickel employed for this purpose does not exceed 15,000 tons. France, for instance, used probably about 250 tons in 1918. In that year the production in Ontario was over 44,000 tons, and the quantity of New Caledonia nickel, refined partly in Europe and partly in the United States, was several thousand tons.

(3) France and several other countries have pure nickel coins—the kind that we should have in Canada. The United States "nickel" contains only 25 per cent of nickel to 75 of copper. It is not such a durable or attractive coin as the pure nickel ones of France and other countries. It was long after the United States coin was introduced that a process was discovered to roll, hammer and stamp pure nickel. These pure nickel coins are the most excellent that have been made, they are most durable in wear, they never oxidize, and it is simply out of the question to counterfeit them successfully.

(4) The Mint authorities will probably say that pure nickel coins are more costly to produce than are those of alloys of the metal. This is owing to the fact that pure nickel has a higher melting point than the alloys and is harder. But surely if France and other countries produce coins of this metal Canada can do so.

(5) Canada should have a pure nickel coinage for the following reasons: Nickel is the most beautiful and the most durable metal for minor coins, it cannot be successfully counterfeited, and it can be called Canada's national metal, since this country produces over 80 per cent of the world's output.

For years the officials of the Ontario Bureau of Mines have been urging the use of nickel in Canadian coinage. The present position of silver coinage is another reason for the employment of nickel coins.

Toronto. W. G. Miller.

DOMINION STEEL CORPORATION.

Col. Grant Morden, M.P. for the Brentford Division of Middlesex, has discussed the purchase by him and his associates of the controlling interest in the Dominion Steel Corporation. Previously they had large holdings in the concern, but their acquirement of the balance of the unissued capital held by the Treasury of the Corporation gives them control of the firm, with its ten millions capital. Col. Morden says: "We propose to consolidate and develop these properties to a much greater extent than ever before." He emphasized the potentialities of the companies with their 5,000 million tons of coal, and 5,000 million tons of ore, so well situated on the seaboard. Lord Furness is one of Col. Morden's associates. Col. Morden leaves for Canada next month, and will be accompanied not only by some of his associates in the deal, but also by a staff of skilled engineers, and together they will examine the working of the companies and their possibilities.—"Colliery Guardian."

PORT ARTHUR NOTES.

By J. J. O'CONNOR.

Another diamond drill has been put in operation on the Leitch iron lands on the Nepigon range. The parties having this range under option appear to be highly satisfied with the disclosures made by the drill-operations and intend continuing these operations during the winter. About three thousand feet of drilling has been performed to date.

J. A. Johnson and Senator W. H. Fowler, of the Swedish-Canadian Mines, Limited, returned to Port Arthur on the 21st from their gold property near Mine Centre. While at the Mine, Mr. Johnson let contracts for 2000 cords of wood and also contracts for the timber necessary for their 1600 feet aerial tramway, shaft house, and for remodelling the Mill. It is the intention to use coal for steaming purposes in the near future, instead of wood, until they develope the necessary water power. Senator Fowler left for Ottawa, and Mr. Johnson for Montreal on the 22nd.

The accident referred to in the "Journal" of the 17th, by which two men were killed owing to the explosion of an air receiver occurred at the Rognon Mine, Contact Bay, and not at the Northern Pyrites Mine, North Pines, as was incorrectly stated.

J. A. McVickie, former manager of the Chambers-Ferland Mine, has returned to Cobalt after spending several months in the Southern States.

THE C.M.I.—A YUKON APPRECIATION.

The Canadian Mining Institute has just dealt with the subjects of the utilization of returned soldiers for prospecting and the free importation of mining machinery. These are subjects of much concern to every mining section of Canada. Mining is the second industry in importance in the Dominion. It is second only to farming in volume of wealth produced.

Yukon shares in common with the other mining districts of the Dominion the need of encouragement of the development of her mineral resources, and will be pleased to see that the mining institute take up something practical and specific in the way of aiding the miner.

It is seldom that one hears of any plan for encouraging the miner. The daily press throughout the land teems with suggestions for aid to agriculture and schemes of getting returned soldiers, immigrants and others located on farming lands. How often does one hear of a scheme to give some practical public aid to the prospector or the man honestly struggling to open the mineral areas of the land with capital, brawn or brain.

It is high time there be some specialized effort for getting the assistance the miner requires. The farmers have forged ahead and have even formulated great political parties throughout the various parts of the continent. How about the miners? The coal miners are perhaps in advance of others in organizing and demanding consideration. The mineral miners are behind in the procession.

In Ontario the other day an entire provincial government was captured by the farmers. At the same time not one miner was elected from all that vast and tremendously important mineral producing area of northern Ontario. Why? What representation will the miner receive in the Ontario legislature? What will the miner receive anywhere if he does not get in and, like any others who desire special attention for his own wants, organize and fight for them.

The Canadian Mining Institute is one channel. It can make recommendations. Not all the recommendations of mining organizations of the past have been in accord with the best interests of the individual miner or th miner as a whole, but in the recommendation for free machinery for mining and for some plan to assist the returned soldier in the mining enterprise, the Canadian Mining Institute is on the right track.

Canada wants the best mining machinery and wants plenty of it, and it does not want to have to pay inflated values on the same in order that some protected or profiteering manufacturer might make a fat thing.

Let the mining machinery be supplied by those who can put up the best article regardless of where it comes from, and let it come in free.

Yukon has enjoyed this benefit in a degree through the efforts of its member. Yukon is about to expand its mineral operations. The more assistance it can secure on machinery imports and the more aid it can get for its returned soldier-miners, the speedier will the country advance, and the sooner will the national government share the prosperity and the faster will the gold and silver reserve which the Empire now so much stands in need increase.

London is crying for more gold and silver. Now is the chance for the various representatives of the people to take the recommendation of the Canadian Mining Institute and grant all the aid possible.

Let Yukon's various soldier, political, commercial, mining and other institutes support the movement and do so while it is warm.—*Dawson Weekly News.*

ACTIVITIES OF THE BRITISH COLUMBIA CHAMBER OF MINES.

So far this season there have been five lectures held in the lecture rooms.

December 4.—A cheaper and Better Fuel, Alexander Sharp. Read by Nichol Thompson.

December 9.—Recent Copper Smelting Practice. Prof. H. N. Thompson.

December 11.—Mine Sampling and Estimation of Tonnages, P. W. Racey, M. E.

December 16.—Preparation of Prospects for Examination, P. W. Racey, M. E.

December 18.—Ore Crushing for Concentration, Prof. Geo. A. Gillies, M. E.

The next lecture will be on January 6th, and will probably be given by Dean R. W. Brock of the University of British Columbia on "The Relationship of Geology to Mining." All the lectures given so far have created interest and have been well attended. Considerable discussion has taken place at each lecture. The Chamber of Mines deserves credit for conducting these lectures under the chairmanship of Professor J. M. Turnbull, as the dissemination of accurate information leads to a better understanding of mining problems, and a more discriminating attitude on the part of the public.

The nominating Committee of the B. C. Chamber of Mines have placed the following names before the members for election of officers for 1920.

President, Dr. Hodge of the University of British Columbia; first vice-president, W. H. Hargraves, Victoria; treasurer, William Godfrey, manager of the Columbia; first vice-president, J. M. Lay, manager of the Imperial Bank; second vice-president, W. H. Hargraves, Victoria; treasurer, Wm Godfrey, manager of the Bank of Montreal (Hasting and Richard street branch); honorary president, Col. E. G. Prior, lieutenant-governor-elect.; honorary vice-president, Hon. Wm Sloan, minister of mines; executive (fifteen to be elected) Messrs. A. M. Whiteside, C. E. Cartwright, J. M. Turnbull, J. A. Dawson, D. Read, P. W. Racey, B. G. Hawkins, G. M. Wooster, Nichol Thompson, N. W. Pirrie, W. T. Newman, Major Fleck, F. W. Crossland, R. S. Lennie, Chris. Spencer, Gordon Drysdale, H. G. McCraney, E. C. Gibson, G. S. Eldridge, R. D. Morkill and N. T. Burdick.

Mr. Dalby B. Morkill, a surveyor of Stewart, B. C. has presented the B. C. Chamber of Mines with a valuable and up to date map of recent stakings in the Salmon River Valley of the Portland Canal district. This gives the location of the Premier, Bush, Forty Nine and Big Missouri and other well known properties in this much talked of district. The map is on view and all are welcome to use it for reference.

A most important and valuable specimen of native and ruby silver from the La Rose claim at Alice Arm, B. C. has been recently received by the B. C. Chamber of Mines at Vancouver, This is on view at the Chamber of Mines exhibit. This is a part of a shipment of 23 tons sent to the Trail Smelter.

A previous shipment of ten tons to the Granby Smelter gave a return of about $1000 per ton. The owners of the claim propose to drive a 450 foot tunnel to enable them to carry on operations twelve months in the year.

Dr. E. T. Hodge, Asst. Professor of Geology in the University of British Columbia, recently lectured before the Rotary Club in Vancouver on "Geology as applied to Mining Prospects." The relations between the business men of Vancouver and the staff of the B. C. University seem to be unusually pleasant, and there seems to be a mutual desire to disseminate and to receive first-hand technical information. After all, this is one of the functions of an educational institution.

Montreal Branch of the Canadian Mining Institute

At a regular meeting of the Montreal Branch held in the evening of the 16th December at headquarters, the Chairman of the Branch, Capt. J. G. Ross, read a paper on the asbestos industry. The reading of the paper was followed by a discussion on the draft of a proposed bill entitled, "The Regulation of the Engineering Profession in Canada." The draft of this bill will be found in the June issue of the Bulletin.

ACTIVITY OF THE CANADIAN MINING INSTITUTE IN THE WEST.

The very successful meeting of the C. M. I. recently held in Vancouver has greatly stimulated interest in the Institute, and will result in a substantial addition to the membership. One significant feature of the Vancouver meeting was the presence of students from the University of British Columbia, and it is expected that the Institute will this year receive probably the greatest accession of student members in its history. The entrance in mining engineering classes at the Canadian universities have been unusually large, and everywhere the Registrars of the universities report not only a large enrollment, but a distinctly good grade of students.

At a meeting of the Western Branch of the British Columbia Division of the Institute held on November 29th, Mr. Charles Camsell was elected Secretary, succeeding Mr. George Wilkinson, who has latterly been in poor health. Mr. Camsell is Director of the Western Branch of the Geological Survey, with headquarters in Vancouver.

The officers and councillors of the Western Branch are now as follows:

Chairman: E. E. Campbell, Anyox, B. C.; Vice-Chairman: J. M. Turnbull, Vancouver, B. C.; Secretary: Charles Camsell, Vancouver, B. C.; Councillors: W. Fleet, Robertson, Vancouver, B. C.; W. M. Archibald, Trail, B. C.; Major R. W. Brock, Vancouver, B. C.; Thos. Braham, Cumberland, B.C.; Jas. Buchanan, Trail, B.C. ;A. G. Larson, Nelson, B.C.; Henry Lee, Britannia, B.C.; R. R. Bruce, Invermere, B.C.; C. C. Campbell, Phoenix, B.C.; A. G. Langley, Revelstoke, B.C.

As a direct result of the stimulus given by the Vancouver Meeting a Vancouver Branch of the Institute has now been formed. Although the plans for the formation of this new branch had been discussed for some time previous to the meeting of the 26th November, they really crystallized at this meeting. At a gathering held in the buildings of the B. C. University on December 9th the formal commencement of the Vancouver Branch was decided upon, and the following officers were elected:

Chairman: Major R. W. Brock; Secretary: V. Dolmage; Councillors: E. T. Hodge, S. J. Crocker, J. M. Turnbull, E. A. Haggen, P. W. Racey.

"A REAL MINISTER OF MINES"

Editor, Canadian Mining Journal:

Dear Editor,—I was very much gratified on reading the report in your issue of Dec. 10th (p. 930) about the speech made by a "real Minister of Mines" at the banquet of the Canadian Mining Institute held recently in Vancouver. This appears to have been a glorious old time banquet with everybody mellow, it could not possibly have been one of the dry affairs that have been in vogue lately. The "real Minister of Mines" announced that the government was offering a bonus of $3.00 per pound on all pig iron manufactured in the province from local ore. How much nicer this was of him than it would have been if he had said anything about taxes or nasty things like that! Pleasant visions arose before me of what this would mean—on a 300 ton plant $1,800,000 per day—the real Minister of Mines stated that this offer had not been taken advantage of. It seems to me that this is where the electric furnace would come in. I wonder none of the advocates of the electric furnace took advantage of it. But unfortunately the Minister reduces this to only $675 per day on a 300 ton plant and even then he does not allow it to operate on Sundays apparently, as he states that this would mean $213,975 per year. If the plant is run 317 days in the year at $675 per day that will give exactly the amount mentioned above, 365 — 48 = 317, that is, they are allowed to run one Sunday in each quarter. If that is not the way, what is it? Any information you can give on this point Mr. Editor would be much appreciated by all mining men. I remain,

Yours in suspense,

HOPEFUL READER.

Yes, it was a perfectly good banquet, but dry as—dry as a caucus of the U. F. O. We regret the error that our truly hopeful correspondent has detected, but we have always found departmental arithmetic difficult to follow.—Ed.

COAL COMPANY DISPOSES OF ITS INTEREST ON VANCOUVER ISLAND.

A deal has been put through by which the Nanoose-Wellington Coal Company of which Lewis Williams, of Seattle, is the president, becomes the owner of the interests of the Nanoose Collieries Company in the Grant Mine at Nanoose Bay, Vancouver Island. While the transfer price of the property could not be learned, it was stated that a very large amount is involved, the property being considered a most desirable one with exceedingly bright prospects for future development. The property comprises 1,200 acres including submarine area, it being the intention of the new owners, according to the statement of Mr. Williams, to commence immediately, operations in the development of the property with the object of largely increasing the output in the near future.

With this aim in view the company will start at once on construction work, the company's engineer having prepared plans for the erection of bunkers, a washer and other top works. These will involve an expenditure of $100,000. Contemporary with the surface improvements, underground development will be carried on. The new owners anticipate increasing the present output to 500 tons daily and, within a month to double the present number of employees which will mean an increased output. The coal area which the Nanoose-Wellington Coal Company is to develop was opened by the sinking of the Grant shaft.—Western Canada Coal Review.

Our Northern Ontario Letter

The Silver Camps

Perhaps one of the most noteworthy developments in connection with the mining industry of Ontario is the decision of the mine operators to organize in such a manner as to be able to voice in concise form the unanimous opinion of the mine operators, relative to questions which have a vital bearing upon the industry The movement has been under contemplation for some time, but it has been given added impetus and takes on greater importance because of the unexpected political developments in the province.

Northern Ontario, particularly the mining interests, is apprehensive over the present situation. There seems to be no reason for longer denying the fact that genuine fears are entertained that the trend of affairs in general is more or less in the direction of sectionalism. With the political arena being invaded, in quite a constitutional manner, by various sections, namel: Liberal, Conservative, United Farmers, Independent Labor, Soldier Candidates and Liberty Leaguers, the decision of the mine operators to form a completely representative organization appears to be quite in keeping with the times, and perhaps necessary to offset the possibility of unwise legislation at a time when the reins of government is in the hands of novices. The new organization may be known as the Ontario Chamber of Mines, or some such name, and will have branches in all the centres of mining activity in the province.

Activity at the silver mines continues at full blast. Due to a number of high grade discoveries it is quite evident that the silver output for the last quarter of 1919 has exceeded any previous quarer during the year.

According to the annual report of the Coniagas Mines, that company produced some 940,267 fine ounces of silver during the fiscal year ended October 31st, and received an average of $1.06 an ounce, or a total of not far under $1,000,000. This compares with an output of 954,264 ounces during the preceding year at which time the price of silver averaged 94¼ cents an ounce. It will be seen, therefore, that the 1919 record exceeds that of the previous year. This is pointed to as a remarkable achievement owing to last summer's labor strike having caused the complete loss of 47 days. The financial statement shows total assets of $652,837.84; current liabilities $204,092.01. Reserve for depreciation, $255,000. Surplus $2,103,-745.83.

At the Crown Reserve it is believed the shoot of high grade ore recently encountered will yield about $140,000. This comes as almost total profit over current earnings for the reason that the shoot was opened up during the course of proceeding with the development of medium grade mill rock. At the time of writing it is understood that upwards of 50,000 ounces have been bagged, with a rich floor yet to mine, and the picking over of some muck. The floor is expected to contain close to 20,000 ounces. With silver at around $1.34 an ounce plus the exchange on New York funds the shoot should have a value of $140,-000, as above stated.

A financial statement just received from the Nipissing Mining Company shows a surplus of $4,463,087, made up of securities amounting to $3,556,457 and ore and bullion worth $906,630. This is the greatest surplus ever accumulated by any precious metal mining company in Ontario. Until the annual statement is issued it will be impossible to secure exact figures relative to ore reserves, but it is intimated that as of the ending of 1919 the reserves will have a value of around $10,000,000.

Alfred R. Whitman, mining geologist, has completed his survey of the Genesee mine and after spending Christmas in the district returned to New York.

On account of the great demand for silver, together with the improved outlook in the Gowganda and Elk Lake districts, traffic to these outlying districts is steadily growing in volume. The disappointing information from that district this week consists of the curtailment of milling operations at the Reeves-Dobie and the definite closing down of the Camburn property at Leroy Lake. The curtailment at the former appears to be only temporary. However, these two disappointments are more than offset by the favorable progress in other directions. On the Walsh property the camp buildings and equipment are being put in shape for a comprehensive scheme of development. The property is pointed to as being one of the most promising of the prospective mines in the Gowganda field. It is located in close proximity to the Miller Lake O'Brien and the Castle.

The deal for control of the Everett property, among the purchasers of which is said to be Sir Henry Pellatt of Toronto, is stated to be making satisfactory progress. From the property of the Eastman Kodak interests, situated on the east arm of Gowganda Lake, a small shipment of ore has been made for testing purposes. The work of tunnelling into the hill from the shore of the lake is proceeding. Montreal interests which are operating the Diadem property at Bloom Lake (formerly known as the Powerful) are learned to be the interests which recently secured a working option on the Silver Lode property at the south end of Miller Lake. Work is to be carried forward aggressively.

In connection with the question of meter gauge railways for the outlying mining camps, W. E. Simpson, representing the Castle Cyanide Company, in an interview with your correspondent appeared to be quite optimistic over the project. From experience in West Australia, however, Mr. Simpson offers many reasons for much care in connection with building such lines. He emphasized the difficulty of linking up trunk lines where the gauge undergoes a change and strongly intimates the likelihood of the Gowganda line some day becoming a trunk line. In this connection Mr. Simpson said:— The Gowganda district is the past, as has been said, has suffered severely, but in spite of the neglect the merit of its mines is being proved and it looks as if the day of relief is coming quickly. Doubtless the government realizes that railways are the life sustaining arteries of every industrial community and may possibly recognize during the coming year that better transportation facilities are absolutely necessary for the exploitation of the mineral wealth not only at Gowganda but also in the belt extending indefinitely to the west in continuation of the proposed railway expansion. Sooner or later the time will come when the line at present known as the Elk Lake branch will be extended not only to Gow-

ganda but will connect the T. & N. O. Railway at Earlton with the Canadian Northern at some point about sixty or seventy miles west of Sudbury. In such an event, therefore, any deviation from standard gauge might prove a serious handicap to the whole district and its consideration is a matter of the greatest importance."

The Gold Mining Camps

The scope of gold mining operations in the various camps throughout Northern Ontario is gradually being enlarged. It is being found less difficult to procure men, although it is still impossible for some of the larger mines to get full requirements. The condition is well beyond its worst, however, and the future of the industry is certain to eclipse all achievements of the past.

At the Dome Mines, work at the 600 ft. level has resulted in the blocking out of a large tonnage of ore on the Dome Extension. In addition to this, it is stated that all is in readiness to cross-cut to the Dome Extension at a depth of 1,150 feet. The option which the Dome holds on the Dome Extension is good until March and promises to be the centre of considerable attention during the next sixty days. Provided the result of the treatment of a thousand tons or so of mill rock from the Extension proves satisfactory, and the Dome decides to exercise its option, the Extension will be taken over on a basis of 30 shares of Dome Extension for one share of Dome Mines. Opinion in Porcupine leans strongly to the belief that the deal will go through.

The opening of the new year once more adds the Dome Lake to the producing list, the mill which was damaged by fire last summer being once more in shape for operation.

The sampling of the Moneta property by the Porcupine Crown interests is proceeding and some kind of a deal is believed to be likely between these two companies, either on the basis of purchase of the Moneta by the Porcupine Crown or a merger of the two properties. In so far as the Moneta has considerable prospective merit but has no mining plant or mill, and considering that the Porcupine Crown is well equipped as regards mining and milling plant as well as having some $500,000 in ore reserves, the consolidation of these two properties would appear to be to their mutual benefit.

The output of the Hollinger Consolidated for the fiscal year ended December 31st, 1919, is unofficially estimated at approximately $7,000,000. Basing calculations on official figures which show an output of $4,839,845.49 for the first thirty-six weeks of the year, or an average of $134,440.01 a week, the indicated output for the whole year works out at $6,990,880.52. This does not take into account any increase during the closing sixteen week, and which increase would appear likely to bring the year's total to approximately $7,000,000. This compares with an output of $5,752,370.87 during the preceding year, and thus shows an increase of close to a million and a quarter dollars above the previous best year in the company's history. This record has been established at a time when the number of men available only permitted the operation of the plant at about seventy per cent capacity and holds out assurance of a further big increase in 1920 provided the desired number of men can be procured. The output to date from the Hollinger amounts to between $32,000,000 and $33,000,000. Owing to a typographical error, a former unofficial report referred to a production to date of close to $43,000,000.

In regard to the outlying gold areas, it has been suggested that if narrow gauge railways are to be given a trial, the Kirkland Lake-Larder Lake-Boston Creek-Skead Township areas comprise an ideal field in which to apply it. Such a line, some fifty miles in length, could serve all of the four districts mentioned. It would commence at Swastika and run east through Kirkland Lake, pass the Argonaut mine at Bearverhouse Lake, touch Larder Lake, and thence run south to Skead after which it would turn west through Catherine township and the Boston Creek district and terminate at Boston Creek. It is estimated that a narrow gauge railroad could be built for about $15,000 a mile and that the entire "loop" line as above mentioned could be built for about $750,000. As a means of financing the enterprise it is suggested that some 20,000 bonds each of $50 denomination be issued, and that a canvass of the property holders be made to see how many can be disposed of. The plan, if carried out, would appear likely to have the support of all small claimholders as well as operating companies in the districts affected. At any rate, the proposal has been drawn to the attention of the Ontario Government.

At the Miller Independence the new central shaft is nearing the fifth level, at which point cross-cutting will be carried out to the downward continuation of the rich ore bodies explored in the upper workings. It is estimated that the power plant will be completed and the electricity turned on before the annual meeting which will be held in Dayton during the first week of February.

A contract has been let to continue the shaft on the Kennedy-Boston from the former depth of 48 feet to the 100-ft. level. The work will probably be completed some time in February, after which lateral work will be commenced.

In the Fort Matachewan district work will be confined this winter chiefly to diamond drilling some of the leading properties inclusive of the Matachewan Gold Mines and the Robb-Clemens. On the Nelson claims in the township of Baden, some very rich gold ore is being encountered, and bids fair to enlarge the possibilities of the outlying parts of the Fort Matachewan district.

Following is an Order-in-Council passed by the Ontario Department of Mines, on December 19th, 1919:—

"Upon the recommendation of the Hon. Mr. Mills, the Committee of Council advise that the relief against forfeiture or loss of rights under section 84 of the Mining Act of Ontario, in the case of a recorded holder of an interest in a mining claim, who has enlisted for active service at home or overseas, against the King's enemies, be extended to the 1st day of January, 1921."

During the week ended December 26 two Cobalt companies shipped two cars containing approximately 130,696 pounds of ore, as shown in the following summary:—

Shipper	Cars	Pounds
La Rose	1	65,696
Dominion Reduction	1	65,000
Totals	2	130,696

During the corresponding period there were no bullion shipments.

MINING PERSONALS

R. J. Ennis, general manager of the McIntyre-Porcupine, paid a recent visit to the Gowganda district in connection with the Castle property.

Major Dunlap has returned to Cobalt after paying a brief visit to the Gowganda district.

Neil Morrison, superintendent of work at the Kells property, is spending the holidays in Haileybury.

Alfred R. Whitman, mining geologist, spent Christmas with Arthur A. Cole, before returning to New York.

Capt. Gordon W. Nicholson.

Capt Nicholson who recently returned to Toronto from overseas, was formerly in the employ of A. E. Osler and Company, Toronto. He has been elected a member of the Standard Stock Exchange and will open an office in Toronto.

The many friends in Toronto and elsewher of Major George A. Grover will be interested in learning that he has opened a law office in the Continental Life Building, Toronto, where he will be in partnership with his brother, Capt. J. I. Grover. The firm will be known as Grover & Grover. Major Grover will be remembered in the mining industry through his connection with the firm of J. B. Holden & Co., in the flotation of La Rose and Hollinger mining companies. He is a graduate in mining engineering of 1902 and graduated in law from Osgoode Hall in 1911. The Major had long overseas service, having been attached to the Princess Pats.

OUR BRITISH COLUMBIA LETTER.

The Metal Mines.

Stewart, B. C.

The bonding of the Northern Light, comprising eight claims, owned by Charles and William Bunting; the Woodbine group of two claims and fraction owned by Dave O'Leary and Charles Lake; and the Cobalt Group of three claims owned by John Hevland, is announced from Stewart, B. C. These properties, situated in the Salmon River Section of Northern British Columbia have been taken over by W. A. Melloche. M. E., for the Alquaquin Syndicate of Belgium. It is stated that Mr. Melloche has let a contract with Lynch Bros., of Seattle, Wn., to put three diamond drills on the ground in the spring.

C. F. Caldwell, a British Columbia operator of many years experience, has bonded the New Alaska, situated in Alaska, just across the boundary on Salmon River. Mr. Caldwell, who returned from the North a short time ago, states that development in the mining camp continues favorable. The New Alaska has three shown values already ranging from $25 to $35 a ton and energetic development is to be undertaken. The Montana Group has produced ore running from $70 to $100 a ton. Adjoining the New Alaska is the New Alaska Extension, which has been bonded by a Vancouver Syndicate and of which encouraging reports are received.

The road between the towns of Stewart and Hyder, the former on the Canadian side and the latter in American territory, has been completed. This has been an expensive work and has called for considerable engineering skill. The Provincial Government is responsible for the road, which was decided upon solely to extend mining men the necessary facilities for the opening up of the rich mineral region lying back of the Coast. The road is two and one-eight miles long. one and one-eights of this being the old Dominion Government approach. The remaining mile is entirely rock and threstle work skirting a steep bluff. There are three large trestles. The new road connects the Salmon and Bear River Valleys and makes the mines of either sections easily accessible to either Stewart or Hyder. Wagons or motors may now go from Red Cliff Mine, fourteen miles up the Bear River Valley to the Premier Mine, fifteen miles up the Salmon River, a distance of twenty-nine miles in all. Of course it is now being used by sleighs.

Alice Arm, B. C.

A. J. T. Taylor, President of the Taylor Engineering Company, Limited, has addressed a short report to Hon. John Oliver, Premier of British Columbia, bearing on last season's operations of the Dolly Varden Mine and Railroad. He states that the railroad was completed last September and was in continuous operation up to the 15th of December, 1919. During the period named the Company has hauled from its own mine approximately 7,000 tons of ore, and also has been able to supply transportation for all freight to its own property as well as for that destined to other properties operating in the district.

If reports in circulation in mining circles recently are a criterion of what may be expected there can be no doubt that there will be marked development

activity in the Alice Arm region next season. It has been stated that the Dolly Varden Mine has been sold to wealthy Eastern capitalists and that the majority of the other properties of the locality have been bonded. As to the Dolly Varden it is emphatically stated by Mr. A. J. T. Taylor, President of the mining company, that the mine had not been sold and that there is no present intention of disposing of it. Of the other reports it is learned authoritatively that the Tiger and Last Chance mineral claim, situated adjacent to the Dolly Varden, have been bonded by Eastern American interests and will be thoroughly explored next year.

Greenwood, B. C.

The Bell Mine, situated on Wallace Mountain, is a promising property which is being successfully operated by P. E. Crane, a graduate of the mines school at Pullman. The ore lies in narrow bodies containing high values in silver, this being characteristic not only of the Bell but of other claims in the same region. The product of the Bell contains 100 ounces of silver in a general way, although a carload shipped some time ago containing an average of 502 ounces and was sold for $17,000 after the deduction of all charges. Among other contributors of the districts are the Salt, Napanee, Rob Roy, Duncan and Bounty Fraction.

Princeton, B. C.

That the Canada Copper Corporation has proceeded with the construction of its concentrating mill and the development and equipment of the mine at Copper Mountain as far as possible without a railroad and electric energy is reported from Princeton. The Mill, has a capacity of 2,000 tons daily and is practically complete. In the meantime the construction of the railroad, which is to cost $1,000,000 or more, and of the power line, the cost of which will be at least $200,000, is proceeding steadily. Some 500 men are employed on the railroad. Half of the construction has been completed, including much of a tunnel which will be several thousand feet in length. A large gang of men is employed on the power line between Greenwood and Princeton. This work was started last Spring. It is believed that the railroad and the power line will be ready for operation by next Summer when the Canada Copper Company will be in a position to commence the production of ore and concentrates.

Trail, B. C.

The site of the copper mill of the Consolidated Mining and Smelting Co., at Trail, B. C., is being cleared for a new structure of steel and concrete, the cost of which is placed at $50,000. It will be much larger that the former mill which was destroyed recently by fire. The Company also is doubling the capacity of its machine shop.

The superintendence of the electrical department is being taken over by Mr. T. Hopkins, who for the past five years has been associated with one of the large Imperial Munition Plants in England. Owing to the fact that the scope of the electrolytic process of ore treatment is constantly widening Mr. Hopkins duties will be of first importance. His qualifications and his many years of experience specially fit him for the post to which he has been called.

Vancouver, B. C.

On behalf of the Tivani Electric Steel Company, now operating at Belleville, Ont., an offer of an iron and steel industry has been made to the City of Vancouver by A. P. Gillis on condition that the City undertakes the provision of 50,000 horse-power at $10 per H.P. with 24 hours continuous service guaranteed. If Vancouver agrees, the purchase of a bond issue of $5,000,000 for the establishment of an electric iron smelter in British Columbia, with a capacity of 200 tons per day for the first unit, and which will have open hearth furnaces and rolling mills, is assured according to Mr. Gillis. He asks that the question of guaranteeing the bonds be placed before the citizens to be accepted or rejected.

Barkerville, B. C.

The Bryce Syndicate, which is developing gold quartz properties on Proserpine Mountain, near Barkerville, now has options on the Dufferin Group of Claims as well as the Independence and Imperial Groups. This presumably pretty well rounds out their holdings and makes the property a big thing if the work now in progress results satisfactorily. Contracts for three 500 foot tunnels are under way, two of which are in over 100 feet each. A lot of surface trenching on the strike of the veins has also been done and two diamond drills are en route to the property.

Lillooet, B. C.

That the Lorne and another of the operating properties of Cadwallader Creek has been bonded by the Mining Corporation of Canada is reported on good authority. This corporation recent acquired the Pioneer Mine on the same waterway.

Victoria, B. C.

An application has been made to the Provincial Government by W. T. Ward and Associates for the cancellation of rental dues on the placer leases, situated in the Cariboo District, which charges have been accumulating during the years that W. T. Ward and John Hopper have been fighting the question of title through the courts. The opinion is expressed that Mr. Ward has a good case. No decsion, however, has been reached the matter being left in the hands of the Minister of Mines for investigation and report.

THE WESTERN COLLIEREIES

(From our Victoria Correspondent.)

An agreement is reported to have been reached between the operators and the miners of District 18, U. M. W. of A., which comprises Eastern British Columbia and the Province of Alberta. Negotiations as to wages, etc., were in progress at Calgary, Alta., for several days between representative of both sides, assisted by W. H. Armstrong, director of coal operations. The agreement reached covers an increase of 14% in the men's pay and also stipulates that only members of the United Mine Workers of America may work in the mines of District 18.

In discussing the situation Senator G. Robertson, Minister of Labor, said that upon receipt of a notice from the Dirtcor of Coal Operations that there was likely to be difficulty in the near future in the Alberta coal fields, and as such an occurrence could not but result in hardship and suffering in the western provinces which are absolutely dependent on these coal fie'ds for their winter supply of fuel, he had deemed it both important and necessary to take steps to meet the situation and to cope with it before any interruption occurred.

"I have no statement to make regarding the One Big Union," he continued, "other than contained in a letter to Henry Beard in reply to a communication that he addressed to me, a copy of which I am addressing to the press. I feel that from the information contained in my reply the public will approve and endorse the course taken by the coal operators, the United Mine

Workers, and approved by the Director of Coal Operations for the purpose of preventing as far as within their power a deliberate attempt, without cause, on the part of the O.B.U. to bring about a tie-up in the coal industry unless they were recognized. That, of course, is out of the question."

The main points in the Minister's letter to Henry Beard are that it is odviously impossible to recognize two organizations as having jurisdiction to negotiate wage agreements for the same workmen; that the United Mine Workers have a well established reputation for respecting and fulfilling agreements made; that the organization Mr. Beard represents (the O.B.U.) has by its acts and utterances of its leaders indicated no tendency to respect or fulfill any contractual obligation, and that the O.B.U. as an organization was wholly unreliable and untrustworthy. The Senator then adds: "If any action is indulged in by your organization at a time when miners have no justifiable grievance, and which would bring upon the community inconceivable hardship, those responsible for such action must expect to assume the responsibility therefor."

Reports from Calgary and other points on the prairies are to the effect that the shortage of fuel is likely to be felt more or less seriously in the western province of Canada this winter. Describing the situation in Calgary a writer points to its incongruity: with the Drumheller and Three Hills coal fields to the east; the Lethbridge and Crow's Nest Coal Fields to the south; the Bankhead and Canmore Mines to the east; and the Brazeau and Edmonton fields to the north, Calgary, having only 75,000 population, finds it hard to get enough coal for ordinary domestic use in cold weather. Of course, the trouble is that the One Big Union strike of last summer prevented the accumulation of surplus stocks and now that the demand is heavy the coal is being shipped straight from the mines to the hands of the consumer. The city of Calgary is expected to undertake the introduction of a system both to increase the production and facilitate distribution.

The Wakesiah Mine of the Canadian Western Fuel Company, which was opened up recently near Nanaimo, is producing some 200 tons of coal daily. This mine has not been doing much until lately, and the results now being obtained are considered satisfactory. The output, however, evidently is not to be allowed to remain at that level, it being the company's intention to bring it up to 600 tons a day in the course of a few weeks.

Figures issued by the Canadian Western Fuel Co. indicate that, whereas a few years ago the bulk of Nanaimo's coal was marketed in the United States, today the reverse is the case. In 1917, 41.5 per cent of the coal mined by the Canadian Western Fuel Company was sold in British Columbia. In 1918 the percentage had risen to 58.5 per cent and for the first ten months of the present year 70 per cent of the output was sold in the province. In November when the big coal strike started in the United States, this percentage was further increased. Instead of shipping more coal to the other side as might have been expected under the circumstances the company sold 75 per cent of its output in the province. The only coal going to the United States from this company's mines is coal for which contracts were made last summer, when there was not enough business in the province to take care of the output and the mines had to be kept running by seeking foreign contracts. Before the war the company sold most of its coal in the United, but when the war started this policy was changed so that when the war ceased it found itself without foreign markets and more output than it could sell to the domestic trade. This resulted in the seeking of contracts in Seattle, Wn., which since have been retained.

Reports received from the Lignite Utilization Board by the Research Council of Canada indicate that a plant will be in operation near Estevan, Saskatchewan, in August next which will turn out 30,000 tons of briquettes a year, and these briquettes will sell for about $9.40 a ton in Winnipeg, Manitoba.

This plant, it is said, will be the beginning of an industry which will, in a great measure, solve the fuel problem of western Canada, as these briquettes will be equal, ton for ton, to anthracite in heat value.

Dr. A. A. MacCallum, administrative chairman of the Research Council, instances the case of some 30,000 tons of Alberta coal of the inferior variety having been shipped to Winnipeg last year, which gave such poor results that the users declared they would have no more Alberta coal and this winter purchased their supplies across the line at higher prices. This, it was asserted, has taken place despite the fact that much of the Alberta coal is of excellent heat and keeping quality.

The Research Council of Canada has adopted a recommendation that a careful and thorough survey should be made of the oil shales of Canada under Dominion auspices.

The Council also recommends the establishment of a central bureau to collect and disseminate all possible information regarding all natural resources.

MOLYBDENUM RESOURCES OF BRITISH COLUMBIA

(By our Victoria Correspondent.)

With the announcement that John Oliver Arnold, Professor of Metallurgy at the Sheffield University, has perfected an improved method of manufacturing a higher grade of steel by a process in which molybdenum is declared to be the important factor, interest in molybdenite among mining men of British Columbia has revived. For a time during the war when the mineral was so much in demand and its value so high there was much prospecting for it, as well as for other of the rarer minerals brought into prominence at that time.

While molybdenite was found in different parts of the Province, and while in a few instances the indications were declared by engineers to be promising, no property was developed for this mineral alone. Before much progress could be made the war had ceased and the demand immediately fell off. If, therefore, Professor Arnold's announcement proves of the importance that is claimed for, it is expected that the work of discovery, of devlopment, and ultimately of steady shipping will be taken up where it stopped some time ago because of market conditions.

It was known at the time that the mineral was supposed to be very important to the allied cause that a deposit existed at Alice Arm, northern British Columbia. This was the one property of this character which had been developed to any extent. In 1918 it was in-

spected by Mr. George Clothier, Government Mining Enginer, who, in his annual report, said: "The only property on Alice Arm that I visited was that of the Molybdenum Mining & Reduction Company. This property was fully described in the Minister of Mines Report for 1916. It has been inactive ever since and I will therefore omit going into details. I was rather favourably impressed with the ore possibilities and it is to be regretted that the property should lie idle while the demand for molybdenum was so urgent. "It is understood that litigation was responsible for this inactivity, and it is not known whether there has yet been a settlement.

A little over six miles from the Grand Trunk Pacific Railway on Molybdenum Creek there is the Molybdenum Group of three claims, of the development of which the 1918 Report does not speak. In the Bear River Section is situated the Molly Group of four claims on which there has been some development and of which the engineer speaks encouragingly. Without sampling he estimates that the vein averages about 2 per cent molybdenite. "On the whole," he says, "it is a good showing, well located for transportation, and having all the natural advantages of timber, water, and of being easily developed by tunnels."

The New Hazelton Gold-Cobalt Company, whose property is situated on the western slope of Rocher Deboule Mountain is worthy of special mention in this connection. J. D. Galloway, Government Engineer, inspected and reported on this property in 1918. Describing the development he said that "a lower tunnel was started 250 feet below the main tunnel; it was driven as a cross cut for 75 feet and then as a drift on the vein. On November 1st this drift was in 149 feet and work was being continued. Throughout this working the vein carries a shoot of ore, more or less continuous, and varying in width from six to eighteen inches. The ore is a mixture of sulphides and arsenides of iron and cobalt and some molybdenite." Again he says: "The molybdenite content of the vein is quite variable. During the year a car-load of gold-cobalt-molybdenum ore, which came from the upper tunnel, was shipped to the concentration plant of the Mines Branch at Ottawa. The car contained 53,288 lb. dry weight, and the analysis on it was: Gold, 1.24 oz.; $Mo.S_2$, 1.40 per cent; $Mo.O_3$, 0.18 per cent; cobalt 1.12 per cent; nickel, 0.60 per cent; arsenic, 8.98 per cent."

Wm. M. Brewer, Government Mining Engineer, refers to "several occurrences of molybdenite ore found on Buttle Mountain Vancouver Island, near Cowichan Lake, as well as others on the mainland. Unfortunately for the discoverers none of the deposits was developed to a shipping stage previous to the signing of the armistice."

Later on Mr. Brewer deals with the Stave River Group situated in the New Westminster Mining Division, near the upper Stave Lake. He observes that it is possible that a mine of commercial importance "may be developed here, providing the vein material, which carries molybdenite, is concentrated on the ground. The extent of this material is apparently so great and the structure of the occurrence of the deposit of such character that mining operations can be carried on by quarrying, and possibly after further prospecting it will be determined that a steam shovel could be operated to advantage. While the assay results from the samples taken by the writer do not show a high percentage of molybdenite, it is quite possible that this feature may be overcome by the low cost at which mining, concentration, and transportation can be carried on."

Attention also has been directed to the property of the Index Milling & Mining Company, situated on Texas Creek, twelve miles from Lillooet. This company claims to have the highest grade molybdenite on the continent, assaying between 15 and 19 per cent. The Texas Creek Mine was opened in 1914 and taken over by the present company in September, 1918. Since then they have made cuts to 900 feet and have taken out 16 tons of ore, half of which was shipped to Ontario, while the remainder still is on the dump. All shares in this company are said to have been taken off the market.

It is apparent from these notes that British Columbia has potentialities as far as molybdenum is concerned and that if the demand should again become marked, important developments may be considered assured.

Note: As stated in last week's "Journal," the cabled despatches from England regarding Professor Arnold's reported new formula for molybdenum steel are so obviously incorrect in the main particulars, and so patently cabled with a political bias, that it will be well to await Prof. Arnold's own publication of his discovery before assuming that molybdenum deposits have assumed a new and increased value.—Ed.

BOOK REVIEW.

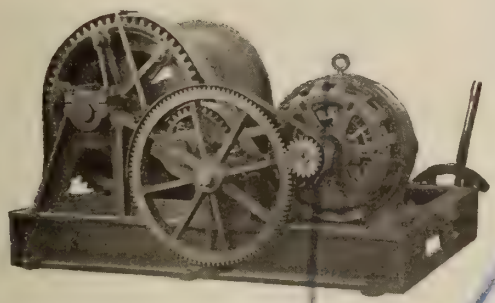
INDUSTRIAL FUELS, by J. Stephenson. Published by the Westman Press, Ltd., 72 Queen St. W., Toronto. 190 pages, 107 drawings. Paper backs, $2.25, Cloth, $3.00. 9¼ by 6 inches.

The author of this comprehensive brochure is also the author of "Elements of Water Gas," of which a second edition is in preparation, and is with the United Gas and Fuel Co. of Hamilton, Ont. As is stated in the preface, the scope of the subjects treated is unusually broad, but for executives who have the choice of several fuels and desire to make quick comparisons. the book affords a concise survey of all the better known and some of the lesser known fuels that are adapted to industrial uses. The fuels treated on include coal, natural gas, coal gas, oil gases, producer gases, coke, and fuel briquets. The application of gases as commercial sources of fuel is fully dealt with, and a chapter is devoted to fuel analysis. The concluding chapter deals with fuels of the future, including domestic garbage, and alcohol, the possible sources of fuel alcohol being enumerated.

A perusal of the work reveals an astonishing variety of fuels available for industrial uses, but we believe the most important indication afforded by the author's survey of a varied field is that the fuel of the future will tend more and more to be used in a gaseous state, or in the condition that most closely approximates to the gaseous state, namely, dust fuels, allowing an intimate admixture during combustion with the oxygen of the air and consequently approximately complete combustion.

The "Journal" is pleased to be able to review a work of this nature, written and published in Canada, and takes this opportunity to congratulates the author and the publisher thereon.

SAFETY FIRST HOISTS and CAGES



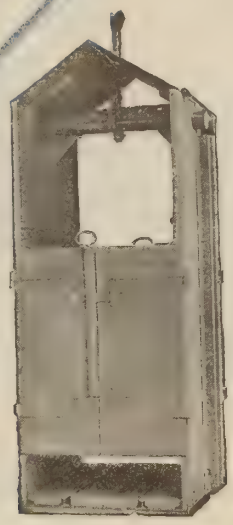
ELECTRIC MINE HOIST, with Drums keyed fast to shaft, so it cannot revolve in either direction except the power is applied.

This type Hoist is made also for Steam Drive.

Either kind, Steam or Electric, is offered in 7 sizes, from 10 to 50 Horse Power.

Send for our Catalog of Mine Hoists, Cars, Cages, Buckets, Etc.

It will interest you.



SAFETY MINE CAGES made to fit your shaft. We build these cages to suit you and your workmen. They are Safe, Strong and Reliable. We guarantee the Safety Device of our Mine Cages to be quick and positive in its action. It can be relied on to work and to hold the cage safely at any time in case of accident. The springs are strong, the dogs are properly designed and adjusted, and the whole device is made amply strong for any emergency.

Marsh Engineering Works, Limited, *ESTABLISHED 1846* **Belleville, Ontario**

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BOOK REVIEW.

Petrology for Students. An introduction to the Study of Rocks under the Microscope. By Dr. Alfred Harker, Reader in Petrology to the University of Cambridge. Revised fifth edition, 1919. Price 8s. 6d. Cloth, 5 by 7¼ inches. 300 pages with Index. Illustrated. Cambridge University Press. This little volume is a textbook designed for the use of students under the direction of a teacher and having access to demonstrations on actual rock specimens under the microscope. No colored plates are shown. The work is a standard students' textbook used in British schools, under the circumstances mentioned, and the rock specimens illustrated are chiefly drawn from British sources, with the addition of some specimens from the British Colonies and the American Continent.

REASONS FOR EMIGRATION OF MID-EUROPEANS FROM CANADA TO THEIR HOMES.

The following explanation of the reasons which are impelling many former residents of central Europe to return to their homes was given by the travelling agent of a steamship line to the Glace Bay "Gazette" recently, and is of sufficient general application to suggest re-publication for the benefit of our readers.

The steamship representative stated:

"The chief reason for these foreigners going home is that they have their families in the old country. They have not heard from them during the war and are only now receiving letters from home. Almost every one of them is a born farmer. There has not been any production in the war stricken countries for the past five years, and for that reason the value of the land has decreased. They have been receiving letters from their people lately stating that land can be purchased very reasonably.

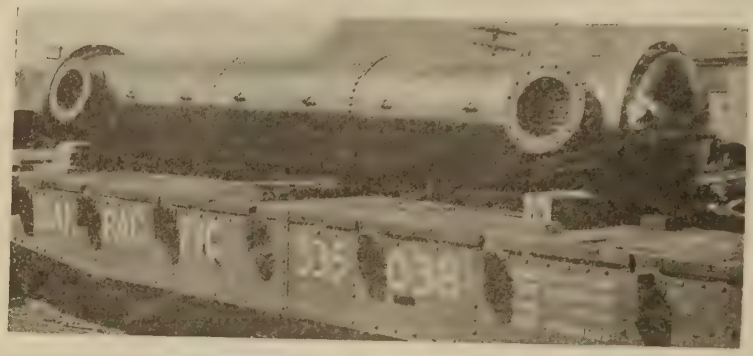
"During their stay in Canada every one has accumulated from $2000 to $3000 in Canadian currency and at the present low rate of exchange in their own country money,, if a foreigner possesses $2000 in Canadian money it is worth about 200,000 kronen in his native money, which in their own countries is considered a vast fortune.

"That is one of the main reasons why the foreigners wish to leave the country. They feel they can do much better in their own native country, especially as the country needs them more than they ever did. In the most devastated portions of Europe, the majority of people left I imagine, are cripples, under-aged, over-aged and helpless women and children. Thus there are not many people to rebuild the country to its pre-war condition.

Most of the foreigners leaving this country will be Galicians and Poles, which represent the majority of the foreign element in Canada. After the ratification of the peace treaty almost all this element in Canada will depart for their native lands."

Nelson, B.C.—C. A. Seaton, of the staff of the Sullivan Mine, Consolidated Mining & Smelting Co., Kimberly, has taken over the management of the Molly Gibson Mine, situated on Mount Kokanee, a property operated by the Company. H. L. Batten, who has held this position for some time, is moving to the Coast.

STEEL PLATE WORK OF ALL KINDS FOR MINES—Particularly



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IDLE PITY GIVING WAY TO PRACTICAL EFFORT ON BEHALF OF CANADA'S SIX THOUSAND BLIND.

You have doubtless been interested in what you have read or heard regarding the progress of a national effort on behalf of the blind of Canada.

Do you realize just what this effort means?

Here are some of the things that are being done:

Industrial training and employment is being provided for the blind in centres established in Halifax, Toronto, Winnipeg and Vancouver.

Useful handicrafts and the reading and writing of embossed characters are taught in the homes of those blind people who for various reasons are unable to take training at one of the regular centres.

The product of the home-workers is bought and sold.

Personal contact is established with recently-blinded persons, and with cases which are sometimes so old that they become new in a very real sense. This work is done by an experienced Field Agent.

Books, magazines, and music in embossed types are circulated free to the blind of Canada. The monthly average circulation of books, etc., is close to eight hundred. The Institute also arranges for the transcription of music for any of its members at cost-price.

An active publicity propaganda dealing with various dangers to which the eye is subject is carried on, and this is followed up with personal work, looking to the larger co-operation of medical men and nurses, employers of labor, Boards of Education, etc., in the vital matter of preventing blindness.

A residence and training-centre, "Pearson Hall," has been provided where blind soldiers may find congenial conditions while taking vocational instruction. In this connection it may be interesting to know that the Institute has entered into an agreement with he Department of Soldiers' Civil Re-Establishment, under which the Institute has established an after care department for Canadian Soldiers blinded in the war.

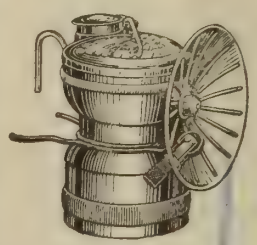
There are other things, but they may all be summed up by saying that the Institute endeavors in every practical way to advance the interests of the blind and to ameliorate the conditions under which they live.

Will you aid in supplying the most vital need of this work?

Then mail your cheque to the Canadian National Institute for the Blind, 36 King St. East, Toronto, Ont.

Note: We are glad to give space to the foregoing announcement.—Ed.

SUN*RAY



WORKS WITHOUT WATCHING

Every *SUN*RAY* is built upon lines proven correct by experience, — built of absolutely the best material and with the best workmanship procurable.

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A 200 to 500 ft. cableway complete or in parts, capacity 1 to 5 tons.

An air compressor oil or gas driven, direct drive preferred capable of running 3 to 5 rock drills.

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